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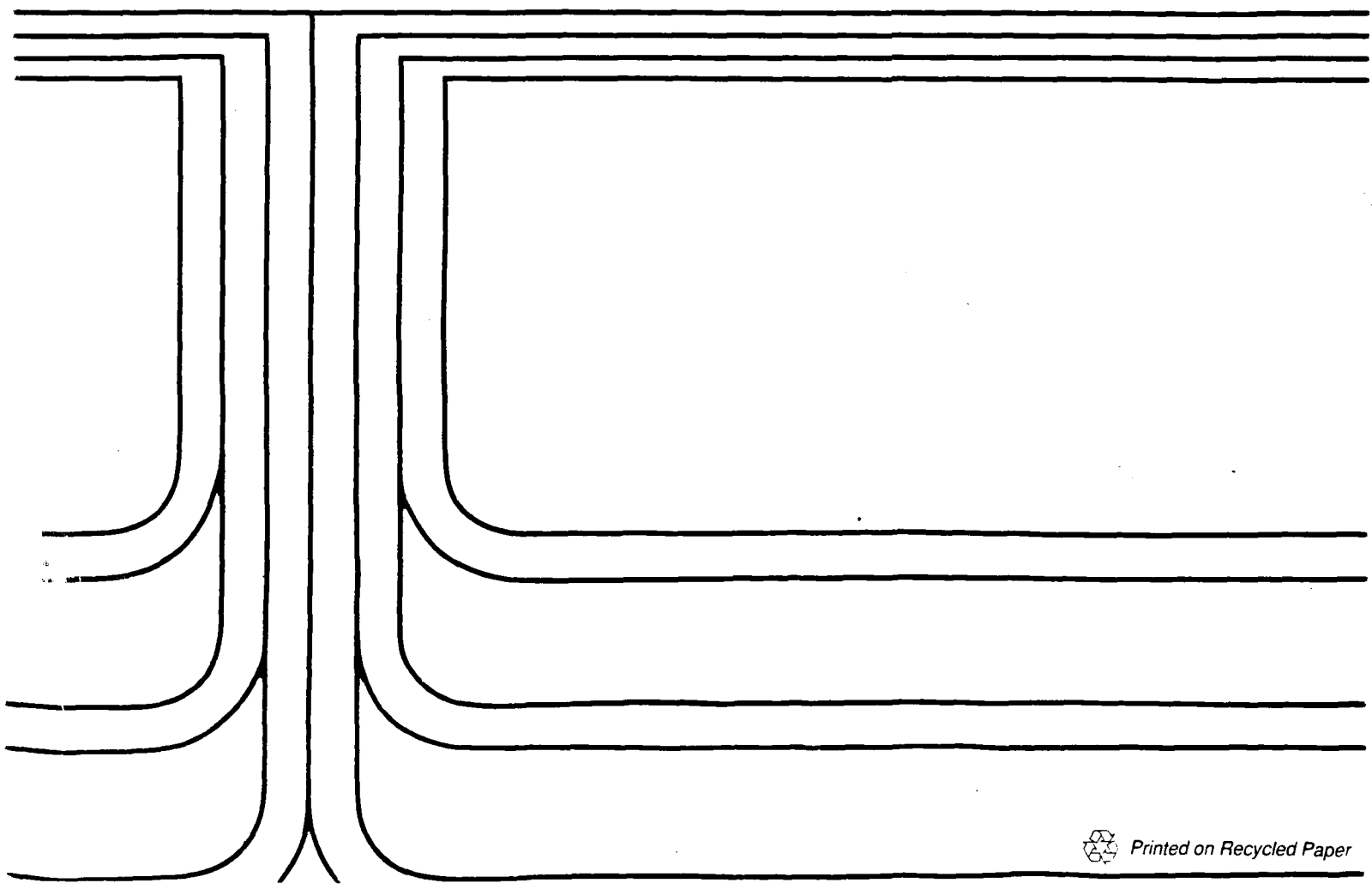
# Ground Water Indicator Pilot Study In The State Of New Jersey



# GROUND-WATER INDICATOR PILOT STUDY IN THE STATE OF NEW JERSEY

Office of Water
U.S. Environmental Protection Agency

September 1991

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# EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA), Office of Ground Water and Drinking Water (OGWDW) is investigating the use of indicators to track progress and trends in ground-water protection efforts. This report presents the results of a pilot study in the State of New Jersey to identify the availability and usefulness of existing ground-water data to support the use of these indicators. EPA chose New Jersey for this pilot study for three reasons: 1) the state is considered to be ground-water data "rich," 2) the state has a high level of regulatory development, 3) and over one-half of the State population relies on ground water for drinking water.

Five ground-water quality indicators were investigated in this pilot study:

- **Maximum Contaminant Level (MCL) exceedances** in ground-water based public drinking water supplies;
- **On-site and Off-site contamination at hazardous waste sites**;
- **Nitrate** concentration in ground water;
- **Volatile organic compound (VOC)** concentrations in ground water; and
- **Pesticide** use.

EPA conducted this pilot study to determine whether the criteria for reporting ground-water indicators, as developed by a 1986 EPA workgroup, could be met with data collected for the State of New Jersey. These criteria include the following:[1]

- indicators should be based on actual data measurement;
- indicators should lend themselves to graphic display to convey trends and other information readily;
- whenever possible, existing data should be used rather than requiring new data collection;
- data should be collected over time at the same locations; and
- data can have limitations and still be useful as an 'indicator' of ground-water problems or progress.

In general, this study found that data characterizing the five indicators are available and that these data do lend themselves to graphic display, as depicted in this report. EPA used only existing data for this analysis, although EPA noted the need for additional data collection to better characterize several of the indicators. EPA also found that much of the ground-water monitoring data compiled for this study did not fully support trend analyses because samples were not always taken from the same locations over time. Nonetheless, EPA concluded that if the limitations are understood, data are available in New Jersey to at least partially characterize each of the five ground-water indicators.

**Indicator Data Sources in New Jersey**

One or more sources of data were identified to characterize the indicators. After reviewing these sources, one principal data source was identified for each indicator, as follows:

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[1] U.S. EPA, Office of Ground-Water Protection, April 1989. "Indicators for Measuring Progress in Ground-Water Protection." EPA 44016-99-006.

- MCL and drinking water data were compiled from the U.S. EPA Federal Reporting Data System (FRDS);
- Waste site data were gathered from the New Jersey Ground-Water Pollution Investigation Data Base (GWPIDB);
- Nitrate data were retrieved from the U.S. Geological Survey National Water Information System (NWIS);
- VOC data were also drawn from the NWIS; and
- Pesticide data were taken from data files maintained by the New Jersey Bureau of Pesticide Operations.

**Analysis of the Data**

The data drawn from the above sources are summarized in this report in graphical format. The raw data are also presented in tables in appendices to this report. Analysis of these data was complicated by differences in data format and organization among the data bases. In addition, some of the agencies maintaining data bases that participated in this pilot study did not have sufficient resources to support the study fully. Therefore, the Pilot Study focused on the use of readily available data, although additional relevant data sources are noted in this report.

**Achievement of the National Objectives for the Indicators**

In an April 1989 report, U.S.EPA identified specific national objectives for each of the five indicators examined in this Pilot Study. EPA's ability to achieve the objectives for each of the indicators varied:

**Maximum Contaminant Levels**: Data from the FRDS-II data base are sufficient to support the national objectives for this indicator. Although EPA limited the analysis presented in this study to county-level summaries of MCL violation information, the analysis could be organized at different geographic levels and could include analyses of the populations potentially at risk from the violations. However, the population data maintained in FRDS may not entirely reflect the actual size of the population exposed to a particular MCL violation.

**On-Site and Off-Site Contamination at Hazardous Waste Sites**: Automated data management systems maintained by New Jersey do not contain sufficient information to support all of the national objectives outlined for this indicator. EPA was able to retrieve data to assess the number of sites with ground-water contamination in seven of New Jersey's counties. For those sites, EPA was also able to determine the principal contaminants involved and the number of sites that have had their ground-water contaminant plume dimensions fully characterized. However, New Jersey maintains information characterizing the populations at risk from the contamination in paper files which were not readily available for this study.

**Volatile Organic Compounds**: EPA accessed data maintained in the USGS National Water Information System to characterize this indicator. EPA was able to organize the data available from NWIS at the county level and display trends in VOC levels graphically. However, EPA determined that the limited geographic distribution of the VOC analyses and the lack of consistent repeat analyses at many of the sampled wells limited the usefulness of the data to support a State analysis. A more thorough and consistent VOC sampling and analysis program should be developed to better support analyses of trends in VOC levels State-wide.

**Nitrates**: EPA accessed data maintained in the USGS National Water Information System to characterize this indicator. EPA was able to organize these data at the county level and display trends in nitrate levels graphically. However, EPA noted several limitations with the data, including limited geographic coverage and inconsistent repeat sampling at well locations. Nonetheless, until a more thorough sampling program

is developed for nitrate analyses in the State, EPA has concluded that the currently available nitrate data can support the national objectives.

**Pesticide Use**: EPA compiled pesticide usage data collected by New Jersey Bureau of Pesticide Operations in two State-wide surveys. EPA determined that these data can support the national objective of identifying the relative intensity of pesticide use on a county-by-county basis. With time and after completion of aquifer vulnerability analyses in the State, the pesticide data can also be used to support analyses of potential ground-water problems by overlaying the geographic patterns of aquifer vulnerability and pesticide use.

**Additional Indicators**: New Jersey personnel identified trends in sodium and chloride levels in ground water as an additional indicator of salt water intrusion problems. This indicator may be of special interest to coastal counties that are undergoing extensive coastal development and are experiencing increasing ground-water withdrawals. Trends in sodium and chloride levels may also indicate problems resulting from roadway salt applications.

**Existing Practices**

EPA encountered a number of technical and data management problems relating to the quality and availability of the compiled data which limit their application to support the indicator objectives. In particular, EPA identified the following technical issues:

- data are limited in geographic coverage;
- sampling is not consistent in geographic coverage;
- sampling is not consistent over time;
- securing and analyzing samples was not uniform;
- limited repeat sampling is conducted at the same location; and
- sampling depths vary.

EPA also identified problems with regard to the way in which the collected data were managed:

- data bases were originally organized to support objectives that differ from those the indicators were designed to address;
- different agencies were responsible for data presented, leading to potential inconsistencies; and
- missing annual data or other data gaps were not explicitly identified.

While these problems were encountered in the automated files, EPA also noted that many other potential data sources were either not automated or were automated in a format that could not be readily accessed by the responsible agency. In those cases, EPA was not able to access the data for this study.

**Suggested Revisions to Existing Practices to Support Indicator Reporting**

EPA is strongly promoting the wider use of indicator data collection across all Federal and State programs. An EPA Task Force, with State participation, developed concrete principles and objectives to ensure effective and consistent decision-making in all Agency decisions affecting ground water, and will

also institute State Comprehensive Ground-Water Protection Programs.[2] Monitoring and data collection is one area that will be addressed.

As New Jersey continues its monitoring and data collection efforts and begins to develop its comprehensive program, it is important to keep the issues noted in the pilot study in mind. For example, sampling and analytical consistency may be promoted by establishing consistent scientific and data collection protocols and by promoting the development of ground-water monitoring networks, as appropriate, to provide trend data. Data management activities that employ standard data collection formats for each of the indicators are already underway in New Jersey to maintain standard data management protocols between agencies. Cooperative efforts between EPA and New Jersey will ensure that information collection activities support the objective of protecting the nation's ground-water resources.

To begin moving toward data consistency, EPA, with States and other Federal agency work group participants developed a set of the most critical data elements for ground-water quality information. These data elements form the foundation upon which ground-water data users may build their own data base, adding elements to meet their specific needs. The use of this minimum set of data elements (MSDE)[3] will ensure that EPA and the State can share and manipulate ground-water data to support better environmental decision-making, and facilitate cross-program integration.

Once adopted, these revisions will greatly assist in supporting the collection, management, and reporting of indicator data needed for future 305(b) reports.

**Resources For Implementing**

Initially, the resources required at the State level to implement national indicator reporting may be extensive. The State cannot significantly improve its data collection and reporting without expending the necessary resources to correct deficiencies. As the State establishes monitoring networks and integrates their information systems, data will become more accessible for use in indicator development. Furthermore, after the information is collected and the data elements and data reporting formats for including ground-water indicators in 305(b) reports are identified and applied, the effort expended for completing the 305(b) report will be greatly reduced.

**Next Steps**

This pilot study is one of three studies EPA completed investigating the use of ground-water indicators in 305(b) reports. A Findings Report has been prepared which outlines and summarizes the information and knowledge gathered in Idaho, Minnesota, and New Jersey. The Findings Report also makes recommendations regarding the implementation of indicators in future 305(b) reports. Based on these recommendations, EPA is developing a Technical Assistance Document (TAD)[4] to provide technical guidance to the States on how to gather and use indicator data as part of their 1992 305(b) Reports. The TAD is also intended to help set the stage for those States that are moving toward developing comprehensive ground-water monitoring and information systems, particularly in relationship to ground-water indicator reporting, and to assist those which are already in the process. The TAD is expected to be completed by early 1992.

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[2] U.S. EPA, Office of the Administrator, "Protecting the Nation's Ground Water: EPA's Strategy for the 1990s," EPA 21Z-1020, (Washington, D.C.) July 1991.

[3] U.S. EPA, Office of Ground Water and Drinking Water, "Definitions for the Minimum Set of Data Elements for Ground-Water Quality," (Washington, D.C.) July 1991 (draft final).

[4] U.S. EPA, Office of Ground Water and Drinking Water, "Technical Assistance Document," (Washington, D.C.) September 1991 (draft).

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# I. INTRODUCTION

## A. OVERVIEW AND PURPOSE OF THE REPORT

The U.S. Environmental Protection Agency (EPA), Office of Ground Water and Drinking Water (OGWDW) is responsible for EPA ground-water policy coordination and planning for the Agency. OGWDW is also responsible for working with the states to develop and implement state ground-water policies and guidelines, enhancing ground-water data management, and initiating and conducting special studies of ground-water contamination, among other tasks.[1]

As part of this overall ground-water effort, EPA has been investigating the use of indicators used to track progress and trends in ground-water protection efforts. In April 1989, EPA published the Report, Indicators for Measuring Progress in Ground-Water Protection, which presented the results of a three phase process used to develop a set of ground-water indicators. The process stressed a number of principles that should be considered when choosing and verifying potential indicators, including:

- indicators should be based on actual data measurement;
- indicators should lend themselves to graphic display to convey trends and other information readily;
- whenever possible, existing data should be used rather than requiring new data collection;
- ideally, data should be collected over time at the same locations; and
- data can have limitations and still be useful as an "indicator" of ground-water problems or progress.

The indicators, which are described below, can be used by states as part of their biennial National Water Quality Inventory Report to Congress under the Clean Water Act, Section 305(b).

EPA selected three states (New Jersey, Minnesota and Idaho) as part of a pilot study to investigate the usefulness of these indicators to track progress in ground-water protection efforts. This report presents the results of the investigation in the State of New Jersey to identify the availability and usefulness of existing ground-water data. EPA selected New Jersey because it was considered to be "data rich" and would represent a high level of regulatory program development.

EPA collected data presented in this report with the assistance of New Jersey, U.S. Geological Survey, and Ocean County, New Jersey personnel. While EPA discusses a number of data bases in this report, only selected data are presented due to problems in data acquisition and resource limitations.

**Rationale for Ground-Water Indicators**

EPA developed a set of indicators that States can use to track progress and set priorities in ground-water protection efforts.[2] The initial set of ground-water indicators includes:

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[1] U.S. EPA, Office of Ground-Water Protection, April 1989, "Indicators for Measuring Progress in Ground-Water Protection", EPA 44016-88-006

[2] U.S.EPA, February 1989, "Guidelines for the Preparation of the 1990 State Water Quality Assessment (305(b) Report)", page 23.

**Maximum Contaminant Levels (MCLs)** - This indicator measures quality of ground-water used for public drinking water supplies, the effectiveness of ground-water protection efforts, and the population at risk from contaminated supplies.

**On-Site and Off-Site Contamination from Hazardous Waste Sites** - This indicator tracks contamination in and around hazardous waste sites as a measure of the effectiveness of ground-water protection programs, potential risk to drinking water supplies, and the population served by those supplies.

**Volatile Organic Compounds (VOCs)** - This indicator measures ground-water contamination from industrial and non-industrial activity.

**Nitrates** - This indicator measures ground-water contamination from sources such as agricultural activity and septic systems.

**Extent of Agricultural Pesticide Use** - This indicator measures pesticide usage in agricultural areas.

These indicators encompass existing data and data that can be collected by the state over time. The indicators also lend themselves to graphic display to convey trends in ground-water quality and vulnerability.

**Reporting Indicators Under the 305(b) Process**

An important application for the indicator data will be in developing State Water Quality Reports for inclusion in the biennial National Water Quality Inventory Report to Congress under Section 305(b) of the Clean Water Act. Section 305(b) mandates that states develop and report information concerning the quality of the nation's water resources to EPA and the U.S. Congress. The 305(b) process is an essential aspect of the national water pollution control effort. It is the principal means by which the EPA, Congress, and the public evaluate water quality, the progress made in maintaining and restoring water quality, and the extent to which water quality problems remain. Many states rely on the 305(b) process to gather the information needed to conduct program planning, and to report to their legislatures on progress in ground-water pollution control and resource protection programs.

The New Jersey 1988 State Water Quality Inventory Report (305(b) Report) is the eighth in a series of State Reports prepared by the New Jersey Department of Environmental Protection (NJDEP) since 1975. The Report presents an assessment of current water quality conditions in the State's major rivers, lakes, estuaries and ocean waters; describes which waters are attaining State designated water uses and national clean water goals; identifies pollution problems in surface waters; and identifies the suspected and known sources of water pollution.[3] The 305(b) report describes the quality of both surface and ground-water supplies within the State, although the primary emphasis is on surface water quality. The Report presents a discussion of ground-water quality and quantity conditions in the State and the current management efforts for the resource. The conclusions addressing ground-water quality presented in the Executive Summary of the Report include:

- Currently, about one-half of the State's population relies on ground water for its drinking water.

- Overall, ground-water quality is considered naturally good in the State. There are problems, however, as evidenced by the fact that during the period from 1985 to 1987 the NJDEP responded to 960 ground-water pollution related cases. In addition, well sampling conducted between May, 1985 and December, 1987, indicated that 76 public wells and 139 private wells had unacceptable levels of volatile organic chemicals.

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[3] New Jersey Department of Environmental Protection, New Jersey 1988 State Water Quality Inventory Report.

- Common sources of ground-water pollution in the State include land disposal sites, accidental spills and leaks, underground storage tanks and unknown sources.

- Maintaining adequate ground-water supplies is an important resource issue in the State, and NJDEP has established two Water Supply Critical Areas.

It is expected that the use of indicators will assist New Jersey in further characterizing trends in the quality of it's ground water, as part of future 305(b) reports.

## B. DESCRIPTION OF GENERAL RESEARCH APPROACH FOR THE STUDY

EPA developed research activities to demonstrate the manner in which ground-water indicator data are and can be collected and reported in the State of New Jersey. The activities included on-site interviews, follow up contacts, preparation of a project plan, collection and analysis of data and final report preparation. EPA and contractor staff held on-site interviews with New Jersey personnel on October 18 and 19, 1989 to discuss the project, review supporting documentation, identify available information, discuss data formats, determine data management requirements, identify responsible parties and key contacts, and request assistance in preparing the specified information. Personnel responsible for each of the major data bases were present at the meetings. EPA contractor staff used follow-up contacts to discuss specific comments and to review data availability and usefulness. EPA and contractor staff developed a written Project Plan to present the results of the interviews and follow-up contacts and to identify specific characteristics for each of the data bases to be used to collect indicator data. Following distribution of the Project Plan, EPA and contractor staff scheduled meetings with the personnel responsible for each of the data bases to review any specific concerns, identify specific data requirements, and set time frames to collect the data. EPA and contractor staff collected data on tape and computer disk and analyzed the data to assess and identify trends in ground-water quality, and to track progress in ground-water protection efforts. This final report presents the results of the research activities, and discusses the methodologies used and the problems identified during the data compilation efforts.

EPA collected indicator data State-wide, where available, for each of the five indicator parameters. In some cases, data collection centered on seven counties in New Jersey because of the greater availability of data in those jurisdictions. These seven counties include Camden, Hunterdon, Monmouth, Morris, Ocean, Passaic, and Somerset Counties (Exhibit 1). New Jersey has also complied automated waste site information for these seven counties. In addition, EPA requested the private well data that Ocean County, New Jersey Health Department personnel have collected.

## C. OUTLINE OF THE REPORT

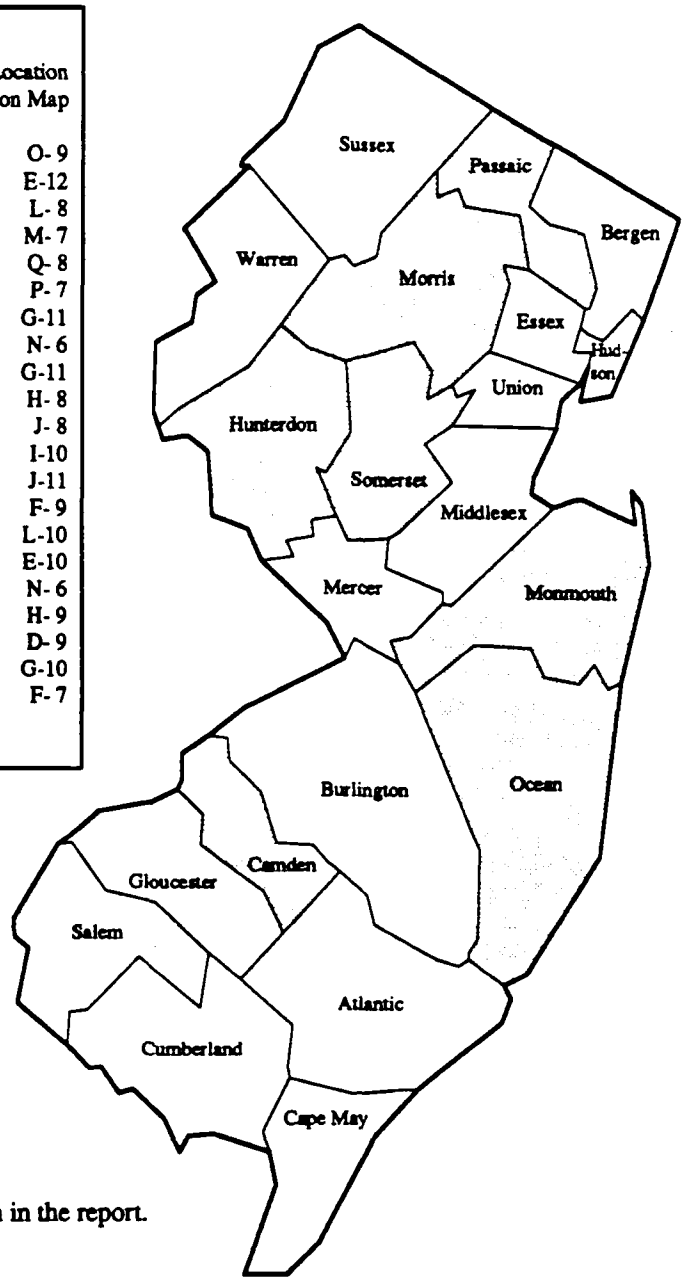
Section I presents an introduction to the indicator concept for measuring the progress of ground-water protection efforts. Section II of this report presents a summary of the hydrogeologic setting in New Jersey and ground-water use. Section III addresses each of the ground-water indicators by presenting the national objectives the indicator was designed to address; a description of the indicator; a discussion of relevant sources of ground-water data in New Jersey and the data management for each of these sources; the approach used to characterize the data and the results of the data collection efforts; suggested revisions to the data collection process; and a conclusion regarding the availability of sufficient data to address the national objectives. Section III concludes with a discussion of additional indicators identified by New Jersey personnel which may be applicable to measure progress in ground-water protection efforts. Section IV presents the study conclusions including a summary of the findings for each indicator, a discussion of the technical and data

# Exhibit 1

## County Map of New Jersey

**Counties**

| Name of County | Population 1986 | Location on Map |
|---|---|---|
| Atlantic | 205,500 | O- 9 |
| Bergen | 836,900 | E-12 |
| Burlington | 384,700 | L- 8 |
| Camden | 492,800 | M- 7 |
| Cape May | 91,900 | Q- 8 |
| Cumberland | 135,300 | P- 7 |
| Essex | 841,900 | G-11 |
| Gloucester | 211,500 | N- 6 |
| Hudson | 553,100 | G-11 |
| Hunterdon | 96,200 | H- 8 |
| Mercer | 320,800 | J- 8 |
| Middlesex | 638,200 | I-10 |
| Monmouth | 542,600 | J-11 |
| Morris | 419,100 | F- 9 |
| Ocean | 392,600 | L-10 |
| Passaic | 460,900 | E-10 |
| Salem | 65,400 | N- 6 |
| Somerset | 215,700 | H- 9 |
| Sussex | 123,700 | D- 9 |
| Union | 504,000 | G-10 |
| Warren | 86,800 | F- 7 |
| Total | 7,619,600 | |




☐ Counties focused on in the report.

management factors limiting the availability of data to support the study, suggestions for modifications in the data management practices to support the study, a brief discussion on resources needed, and the next steps EPA is planning to take to implement ground-water indicator reporting.

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# II. SUMMARY OF NEW JERSEY HYDROGEOLOGY AND GROUND-WATER USE

## A. HYDROGEOLOGIC SETTING

New Jersey is divided into four physiographic provinces, known as the Coastal Plain, Piedmont, Highlands, and the Valley and Ridge (Exhibit 2).[4] These provinces are defined by the common physical features of the land surfaces. Each province is defined by different types of consolidated and unconsolidated deposits, which have similar hydrogeologic properties affecting ground-water storage and flow characteristics. These four provinces can be classified into two groups - Coastal Plain aquifers south of the Fall Line and non-Coastal Plain aquifers north of the Fall Line.[5] The Fall Line, which runs along a line parallel to the Delaware River through Trenton to south of Newark, New Jersey, divides the unconsolidated sediments of the Coastal Plain from the consolidated units and glacial valley-fill deposits of the Piedmont, Highlands and the Valley and Ridge physiographic provinces.

### Coastal Plain

The Coastal Plain is the largest of the physiographic provinces in New Jersey and covers an area of approximately 4,500 square miles in southern New Jersey (Exhibit 2). The five principal aquifers or aquifer systems in the Coastal Plain are the Kirkwood-Cohansey aquifer system, the Atlantic 800-foot sand aquifer of the Kirkwood Formation, the Wenonah-Mount Laurel aquifer, the Englishtown aquifer, and the Potomac-Raritan-Magothy aquifer system. The aquifers are composed of extremely permeable beds of unconsolidated sand and gravel. Less permeable silts and clays form the confining layers within the Coastal Plain and separate the individual aquifers. The Coastal Plain system dips to the southeast and thickens. All aquifers in the Coastal Plain, except the Kirkwood-Cohansey aquifer system are confined, except where they outcrop.

### Piedmont

The Piedmont physiographic province is the second largest province in New Jersey and covers an area of approximately 1,500 square miles. The area extends from the northeast corner of New Jersey to the Delaware River in the Trenton area (Exhibit 2). The province consists of consolidated shales, siltstones, sandstones, conglomerates, and igneous rocks. Ground-water flow in this province is limited to the cracks and joints within the consolidated formations. This feature results in a very complex hydrogeology with varying water yields.

### Highlands

The Highlands physiographic province covers an area of approximately 900 square miles in northwestern New Jersey (Exhibit 2). The province consists of consolidated units of Precambrian gneisses, igneous rocks and Paleozoic sedimentary rocks. Ground-water flow within this province is similar to the Piedmont province, primarily through joints and fractures in the consolidated units. However, water movement in the gneisses is considered restricted to localized areas.[6]

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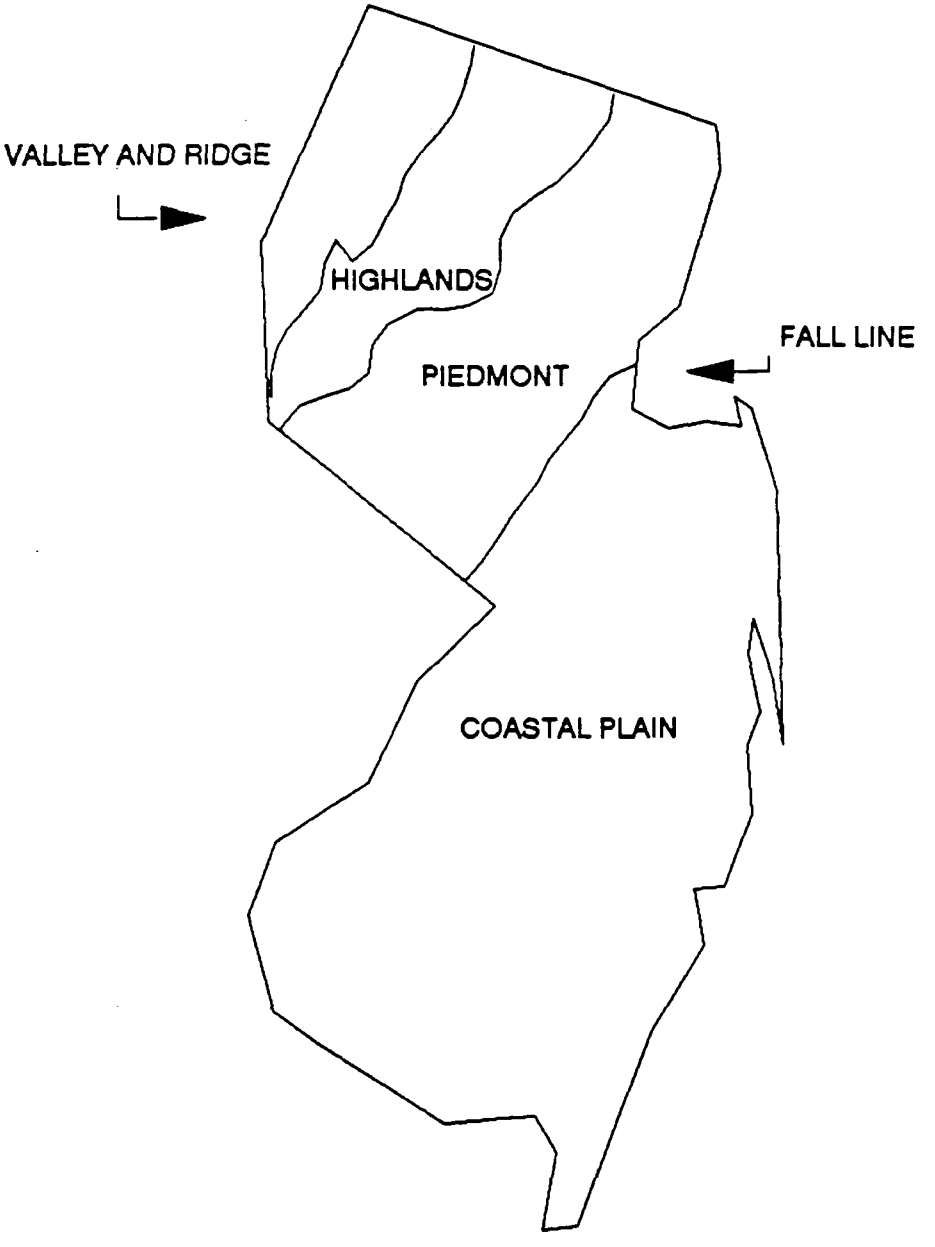
[4] New Jersey Department of Environmental Protection, Division of Water Resources, New Jersey 1988 State Water Quality Inventory Report.

[5] U.S. Geological Survey, 1985, National Water Summary 1984, Water Supply Paper 2275, page 309.

[6] New Jersey Department of Environmental Protection, Division of Water Resources, New Jersey 1988 State Water Quality Inventory Report.

# Exhibit 2
# PHYSIOGRAPHIC PROVINCES OF NEW JERSEY




Source: USGS National Water Summary 1984, Water-Supply Paper 2275

**Valley and Ridge**

The Valley and Ridge physiographic province covers an area of approximately 580 square miles in the northwest corner of New Jersey (Exhibit 2). The Province consists of folded and faulted Paleozoic sedimentary rocks. Ground-water flow is generally through the fractures and joints within the consolidated units, although some limestone formations permit free flow through solution cavities.

## B. POPULATIONS RELYING ON GROUND WATER

Ground water is the drinking water source for approximately fifty percent of the State's population or about four million people. Approximately ninety percent of the community water systems in the State (588 out of 622) obtain all or a portion of their water supplies from ground-water sources. In addition, there are about 16,000 non-community wells and 400,000 private potable wells in the State, plus additional industrial and agricultural users.[7]

[7] New Jersey Department of Environmental Protection, Division of Water Resources, New Jersey 1988 State Water Quality Inventory Report.

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# III. GROUND-WATER INDICATORS

The following section discusses the data availability and findings related to the five indicators investigated in the State of New Jersey.

## A. MAXIMUM CONTAMINANT LEVELS

This section presents the national objectives, approach and findings of the study of maximum contaminant levels (MCLs) as an indicator of ground-water quality in public drinking water supplies in New Jersey.

### National Objectives

EPA designed the MCL indicator to address the following national objectives:[8]

- identify the degree to which ground-water based water supply systems meet all applicable MCLs,
- identify the size of the population at risk from systems in violation,
- provide an understanding of the geographic distribution of populations potentially at risk,
- identify specific contaminants for which systems are failing to meet the MCLs, and
- identify those contaminants which are responsible for the greatest number of MCL violations.

The following discussion describes the data sources identified in New Jersey to address these objectives, and presents and analyses the data results.

### Description of the Indicator

Maximum Contaminant Levels (MCLs) are water quality standards set under the authority of the Safe Drinking Water Act (SDWA). The Act authorized EPA to establish a cooperative program among local, State and Federal agencies to protect drinking water quality and ensure that human health is not adversely affected by water-borne pollutants. Maximum contaminant levels are set for inorganic, organic and microbiological contaminants, radionuclides, and turbidity.[9]

An MCL is the highest amount of a specific contaminant allowed in the drinking water supplied by a public water system. Primary MCLs are established for contaminants that are known to occur in drinking water, cause adverse health effects, and can be measured with existing instrumentation. As one of the indicators of ground-water quality, MCLs are useful determinants of the quality of the ground water that is used for public drinking water supplies.

The New Jersey Department of Environmental Protection (NJDEP) is the primary agency for implementing the SDWA. New Jersey has adopted all of the Federal MCL standards for inorganic

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[8] U.S. EPA, Office of Ground-Water Protection, April 1989, "Indicators for Measuring Progress In Ground-Water Protection," EPA 44016-88-006.

[9] Data characterizing turbidity violations are not described in this report because this parameter is generally not considered relevant to analyses of ground-water based supplies.

contaminants, microbiological contaminants, radionuclides, and turbidity. In 1983, under Amendments to the New Jersey Safe Drinking Water Act (P.L. 1983, C.443), referred to as A-280, the State mandated the development of 26 additional MCLs for a specified list of volatile organic compounds (VOCs). No Federal MCLs had been set at the time for these compounds. In 1987, EPA published MCLs for eight VOCs that were previously on New Jersey's A-280 list. In most cases, the MCLs developed by the state were more stringent than those set by EPA. Currently, New Jersey has established MCLs for all 26 VOCs mandated under A-280. Nonetheless, this analysis focuses primarily on violations of the Federal MCLs. A separate analysis of the VOCs indicator is provided in Section III-C of this report.

**Indicator Data Management in New Jersey**

New Jersey monitors maximum contaminant levels for the Federal MCL constituents as well as the additional 26 volatile organic compounds identified by New Jersey law. Data for public drinking water supplies are collected by the NJDEP, Bureau of Safe Drinking Water (BSDW) and are stored on the New Jersey Public Water file (NJPWF) data base. In addition, BSDW regularly reports these data to the Federal Reporting Data System (FRDS-II) data base maintained by U.S.EPA. The Ocean County Health Department also collects water quality testing results from private wells for most of the New Jersey MCL constituents. Ocean County maintains these data in automated files.

The NJPWF data base contains data for the MCL constituents listed under the Federal Safe Drinking Water Act; however, these data were not consistently reported on the NJPWF until 1984. The BSDW has collected data for the 26 additional VOCs regulated by the New Jersey Safe Drinking Water Act since 1985. Actual analytical results are reported for "finished water", not just violation/non-violation indicators. The BSDW also tracks a limited amount of raw water data, but most of these data are held by water purveyors.

The following types of information are collected on the NJPWF data base: community water supply inventory (i.e., location, treatment plant type, average production, design capacity, owner, and population served); individual source file (i.e., plant basin number, latitude and longitude, number of wells, permit number, pumping rate, well depth and treatment array, and public water system and seller I.D.); a sample analysis file that includes all analytical testing results, except VOCs; and a VOC file that includes analytical testing results for VOCs (A-280). Additional background on the NJPWF data base is contained in Appendix A to this report.

The Federal Reporting Data System (FRDS-II) contains public water supply data reported by the states. EPA's Office of Drinking Water maintains the FRDS data base to support the Agency's information collection requirements established under the Safe Drinking Water Act. FRDS tracks a number of data elements, including:

- the public water system identification number,
- the location of the PWS,
- the population served by the PWS,
- the sources of drinking water (ground and/or surface water),
- the MCL constituent violated,
- the concentration reported,
- the actual Federally mandated maximum allowable concentration level,
- the date of the violation, and
- the number of months that the system was in violation.

However, the FRDS data base contains several deficiencies:

- the locations of PWSs are provided in longitude and latitude of either the drinking water source (as provided by the owner) or the centroid of the zip code of the system mailing address. Either of these data may be erroneous, as the owner may provide inaccurate information, or the mailing address of the water system may be miles away from the well source;

- systems that are served solely by ground water are designated as ground–water based systems, but those systems that are served by both ground and surface water are designated as surface–water based systems, regardless of the degree to which the system relies on ground water;

- population data provided by FRDS are total populations served by PWSs. As a PWS may use several sources to serve this population, it may be difficult to estimate the extent of exposure to MCL violations;

- FRDS provides no information on the location of actual exposure points, the proportion of a reported population served by each source, or the term during which each source is used; and

- data on location of private wells and drinking water population associated with private wells are limited or non-existent.

The Ocean County, New Jersey Health Department maintains over 1,200 records of private wells in Ocean County. These data have been collected since May, 1987. Data for the 26 New Jersey MCL constituents have been tracked using the "Interim Action Levels and Responses for Selected Organics in Drinking Water" from 1987 to January 1989, and the "New Jersey Primary Drinking Water Standards" from 1989 to the present. The latitude and longitude for each private well are not tracked, but the county uses a coding system indicating the municipality for each property owner who reports well information.

**Approach for Characterizing the Indicator**

EPA's review of the data sources described above revealed that the Federal Reporting Data System (FRDS-II) would provide the most consistent State-wide data base for the Federal MCL constituents. The BSDW was unable to provide analyses and summary data of its NJPWF data base due to budget constraints, and the Ocean County data were found to be difficult to manage and access. Furthermore, EPA believed that the data available through FRDS-II were consistent with those maintained on the NJPWF data base. Therefore, FRDS-II served as the sole source of data for this analysis.

EPA obtained data retrievals from the FRDS-II data base for public water supplies relying solely on ground water in the counties of Camden, Hunterdon, Momouth, Morris, Ocean, Passaic, and Somerset. The data retrievals consisted of public water system violations of Federal MCLs for the years 1982 through 1989 for the following constituents:

- barium,
- cadmium,
- nitrate,
- selenium,
- silver,
- trichloroethylene,

- fecal coliform,
- trihalomethanes, and
- tetrachloroethylene.

**Study Results and Interpretation of Data**

In general, EPA found very few MCL violations for constituents other than fecal coliform. Exhibit A-1 depicts the number of MCL violations for fecal coliform for public ground-water supplies in the seven counties. As shown, the number of violations for fecal coliform was highest in Hunterdon and Morris counties. Data from the FRDS-II data base summarizing the number of MCL violations in the seven counties for the nine water quality constituents are presented in Appendix B; Tables B-1 through B-9.

The pilot study for the MCL indicators demonstrates that:

- MCL data are available at the county level,
- MCL data lend themselves to visual representation, and
- MCL data allow for comparison among counties.

Hence the data available from the FRDS-II data base support a portion of the national objectives for the MCL indicator described above. However, this pilot study did not collect sufficient data either to characterize the geographic distributions of MCL violations beyond the county level or to identify the sizes of the population at risk from these violations. To support such an analysis, the FRDS-II data base does record the location of public water supply systems and the populations served by these systems. As a result, the geographic distributions of the public water supply systems and the sizes of the populations served by those systems could be developed. Nonetheless, there are limitations to the usefulness of the population data recorded in FRDS:

- Population data represent the total population served by a PWS. As a PWS may use several sources to serve this population, it may be difficult to estimate the extent of exposure to MCL violations.

- Population data are recorded only periodically and thus, accurately represent only certain years of the period of record.

Despite these limitations, EPA believes that the population data maintained in FRDS can give a broad brush representation of the national objective to "provide an understanding of the geographic distribution of populations at risk." Furthermore, the NJPWF data base contains location information which can be used to generate geographic distributions. Populations at risk were not analyzed in this pilot study due to resource limitations. In addition, data on populations served by PWSs were not supplied in a timely manner.

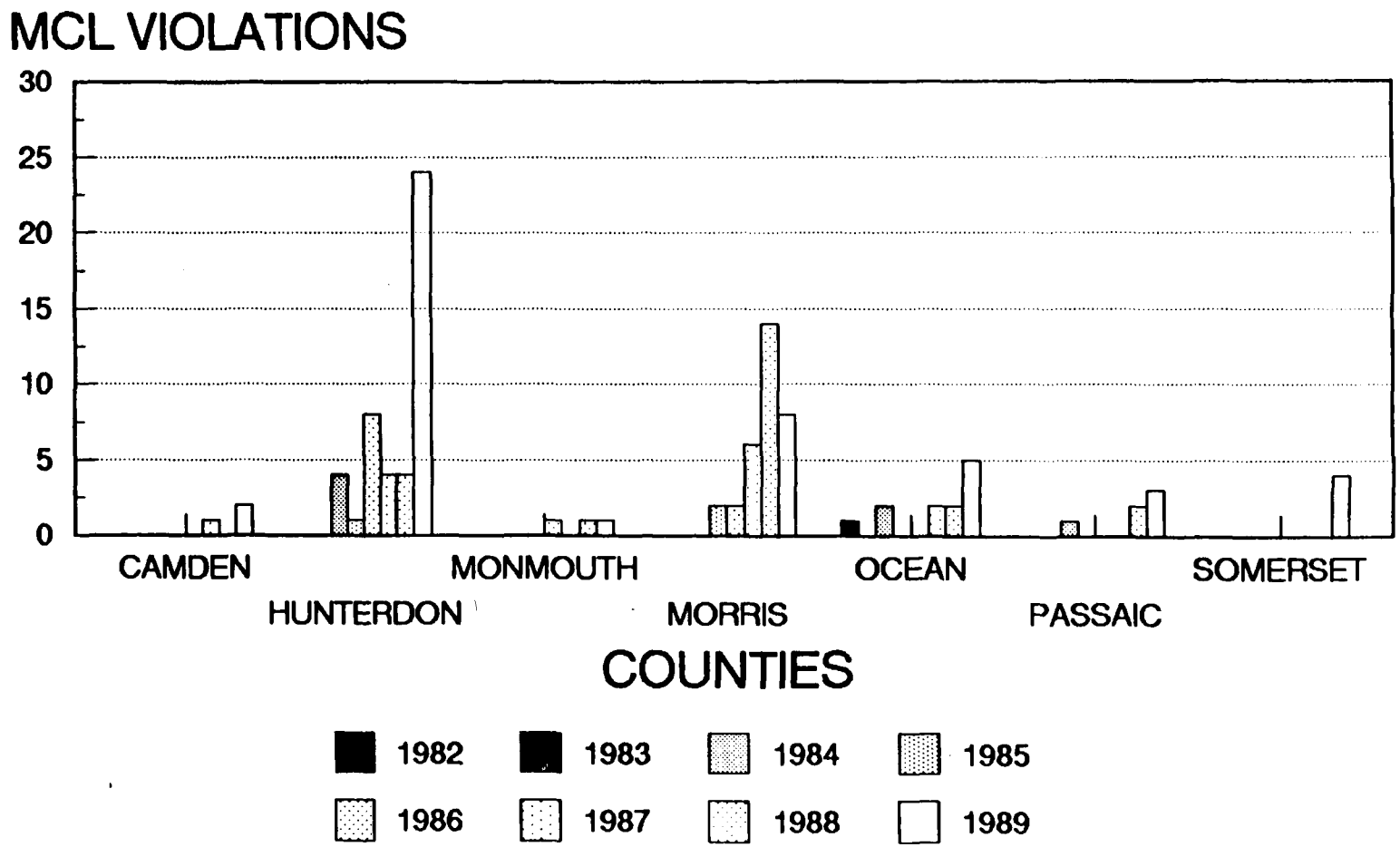
Another uncertainty inherent in the data from FRDS-II and the NJPWF data bases is that they reflect the analysis of finished drinking water rather than raw ground water, and, therefore, do not necessarily represent the quality of ground water at the wellhead. This uncertainty is generic to the characterization of the indicator and is not solely a function of the available data.

**Revisions to the Indicator Data Collection Process**

EPA did not analyze the NJPWF data base because the New Jersey Bureau of State Drinking Water was unable to provide sufficient analytical support and summary data due to budget constraints. However, this data base could provide extensive information to analyze MCL violation trends either in place of, or in addition to FRDS data. Furthermore, in order to assess the geographic distribution of MCL violations, future studies could assess the NJPWF data base, or focus on public water supply location information available through FRDS-II.

## Exhibit A-1

## MCL VIOLATIONS FOR FECAL COLIFORM FOR SELECTED COUNTIES IN NEW JERSEY




Source: Federal Reporting Data System (FRDS-II)

### Conclusions

Data from the FRDS-II data base are sufficient to support the national objectives described above. EPA limited the analysis of supply system geographic distribution to aggregate data organized at the county level, and did not analyze populations potentially at risk. However, data on geographic distributions and population served by PWSs are available from FRDS and are believed to be sufficient to provide a general understanding of the geographic distribution of the populations at risk. The NJPWF data base also contains data which can be used to address the national objectives, although additional work by the State will be needed to access and organize these data.

## B. ON-SITE AND OFF-SITE CONTAMINATION FROM HAZARDOUS WASTE SITES

This section presents the approach and findings of the study of on-site and off-site contamination from hazardous waste sites as a ground-water quality indicator in New Jersey.

### National Objectives

EPA designed this indicator of on- and off-site contamination from hazardous waste sites to support the following national objectives:[10]

- identify the number of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) sites with ground-water contamination on-site and off-site;
- provide an indication of the risk posed by such contamination to the population in the vicinity of off-site contamination; and,
- identify the relative frequency with which various types of contaminants are responsible for ground-water contamination at CERCLA and RCRA sites.

The following discussion describes the manner in which this study was able to address these national objectives with the waste site data collected in New Jersey.

### Description of the Indicator

Active and abandoned hazardous waste sites can serve as significant sources of ground-water contamination and may pose serious risks to human health and the environment. The level of ground-water contamination at these hazardous waste sites, the potential risk to drinking water supplies, and the risk to the populations served by those supplies are each assessed under this indicator.

This indicator also tracks changes in the number of CERCLA and RCRA sites with on-site and off-site ground-water contamination over time as a measure of the progress in managing waste sites. Such indicator data could also be used to monitor progress made in dealing with contaminated sites by evaluating changes in site identification, remedial investigations, remedial design implementations, and site closures.

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[10] U.S. EPA, Office of Ground-Water Protection, April 1989, "Indicators for Measuring Progress In Ground-Water Protection," EPA 44016-88-006.

**Indicator Data Management in New Jersey**

Data characterizing contamination from hazardous waste sites are collected in several data bases managed by New Jersey State agencies. EPA identified three current data bases and a fourth one under development for this study. These data bases include the following: (1) the Major Remedial Action Tracking System (MRATS) data base, maintained by the New Jersey Bureau of Planning and Assessment; (2) the Ground-Water Pollution Investigation Data Base (GWPIDB), maintained by the New Jersey Bureau of Ground-Water Pollution Assessment; (3) the New Jersey Pollutant Discharge Elimination System (NJPDES) data base, maintained by the Bureau of Information Systems; and (4) a new Geographic Information System (GIS) data base, currently under development by the Division of Hazardous Site Mitigation in the New Jersey Bureau of Environmental Evaluation and Risk Assessment (DHSM/BEERA). These data bases are described briefly below.

The MRATS data base is composed of two files. The first is the site file which contains information concerning site locations, such as ID number, name, municipality and county. The second is the Subsite File, which tracks the planned and actual starting and completion dates for each major phase of the remedial process, the completion percentage, and cost of each phase. Example Subsite Files are presented in Appendix C. A site refers to the total area under investigation that may require remediation. The main subsite is defined as the primary source of contamination or the major remedial activity to be conducted at a site. In general, the MRATS data base does not contain lists of specific contamination or the population at risk. It does track phases of remediation and general areas of concern for each site. New Jersey has collected this information since 1986.

The GWPIDB tracks information specifying the status of ground-water investigations or remediations for approximately 3,200 sites that have been judged to require detailed assessments. These sites are regulated under RCRA, CERCLA, or the New Jersey Environmental Compliance and Remediation Act (ECRA). General information, such as site name, location, lead agency, and program or bureau providing geologic support is collected. It is important to note that the investigation location pertains to ground-water pollution investigations, not hazardous substance releases. If a class of pollutants is specified as being present at a site, it means that they were found in the ground water as determined by laboratory analysis. The GWPIDB also contains detailed information characterizing the extent of ground-water contamination at waste sites in Camden, Hunterdon, Monmouth, Morris, Ocean, Passaic, and Somerset Counties (1,265 investigations in 1989); though most of this information is at least eighteen months old. The state plans to continue to update these data and incorporate data for sites in other New Jersey counties. A sample data sheet used for collecting the more detailed site data is provided in Appendix D to this report.

The NJPDES data base is the primary repository for the ground-water monitoring data collected at over 900 sites in New Jersey which are regulated under RCRA or other State and Federal programs. This data base contains Ground-Water Permit tracking data that include: well number, well latitude/longitude, municipality, county, hydrologic unit, aquifer code, well characteristics, contaminants observed, and ground-water monitoring analytical results (i.e., constituent name, sampling date, results, units, etc.). The NJPDES data base also contains a Ground-Water Monitoring data base that includes NJPDES permit number, monitoring well ID number, sample date, parameter number, sample value, remarks used to qualify data, and laboratory number. The parameters and time periods measured are specific to the permit. The data bases cover a five to ten year period. Appendix E to this report contains samples of the forms used to report laboratory testing results and well monitoring data.

A GIS data base tracking waste site locations is also currently under development. It will have two modules: one containing background information on the site (e.g., location and lead regulatory program information) and one that details the contaminants found and various remediation activities. This system is not yet operable. Appendix F to this report contains additional information on the GIS data base.

**Approach for Characterizing the Indicator**

Following review of the data sources described above, EPA concluded that the GWPIDB would provide the best available data source for analysis. EPA chose not to include the other data sources in the analysis because the NJPDES data base did not have information readily available in computerized form, the MRATS data base did not contain specific information on contaminants, and the GIS data base is still under development.

Data retrievals were collected from the GWPIDB for the counties of Camden, Hunterdon, Monmouth, Morris, Ocean, Passaic and Somerset. The retrievals consisted of the following:

- number of ground-water investigations performed,
- number of PCB detections obtained from analyses,
- number of metals detections obtained from analyses,
- number of volatile organic compound (VOC) detections obtained from analyses, and
- the extent of ground-water pollution at the sites, as determined by the number of investigations that have fully characterized the site contaminant plume dimensions.

EPA found that few data were available in the GWPIDB to assess the sizes of the populations at risk around the sites. Therefore, EPA was not able to assess that objective in this analysis.

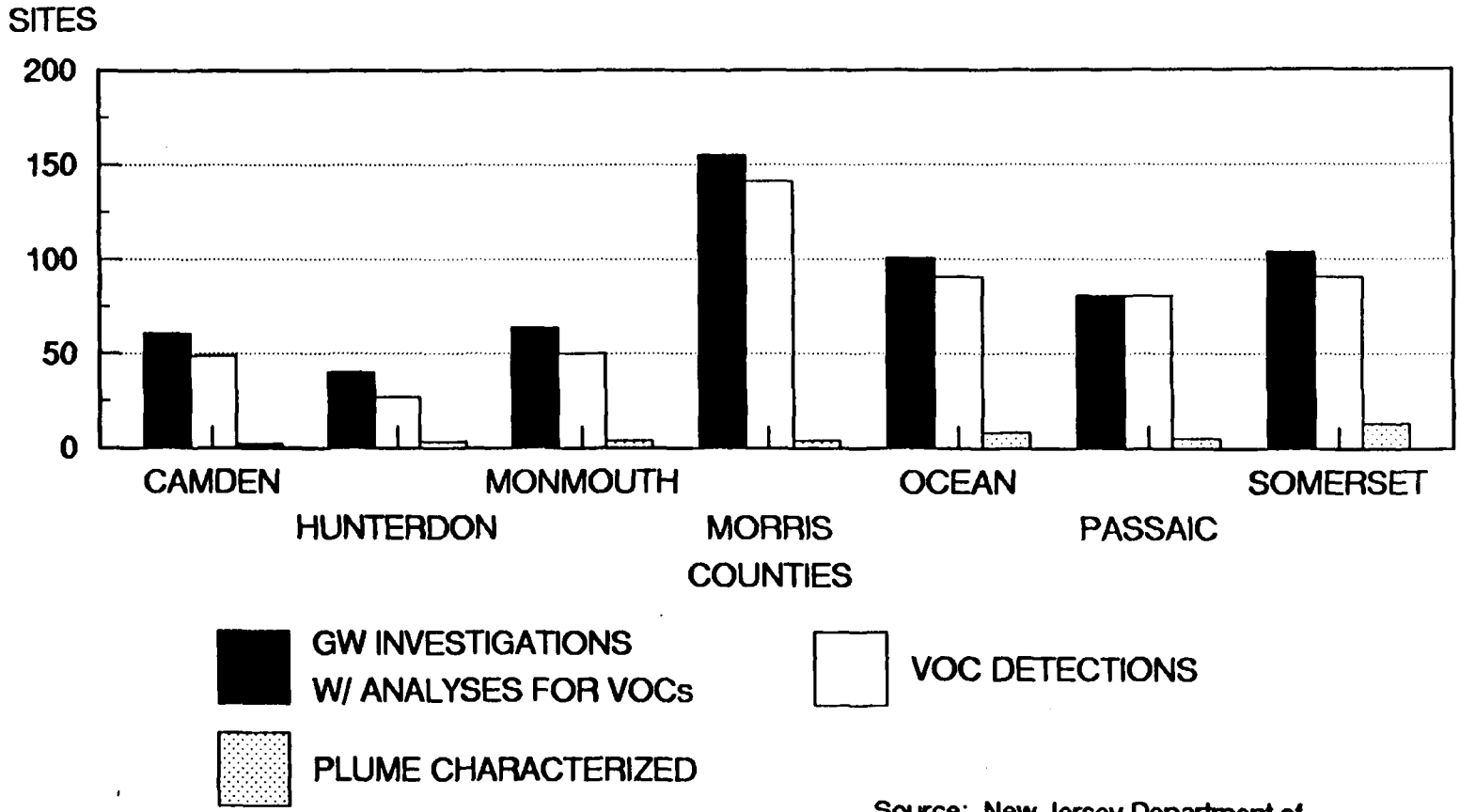
**Study Results and Interpretation of Data**

A total of 530 VOC detections were recorded in the GWPIDB for sites in all seven counties. In comparison, EPA found that 39 PCB and 181 metal detections were recorded. A summary of the data characterizing the number of ground-water investigations performed, number of VOC detections, and the number of sites with fully characterized contaminant plume dimensions for Camden, Hunterdon, Monmouth, Morris, Ocean, Passaic and Somerset Counties is presented in Exhibit B-1. While data characterizing PCB and metal detections are also available for the sites, only VOC detections are shown in Exhibit B-1, because they were found to occur more often. Summary data for ground-water pollution investigations, VOC detections, PCB detections, and metal detections are provided in Appendix G, Tables G-1 through G-4. Because the data presented above have not been collected or reported on a regular basis, it is not yet possible to detect trends in waste site investigations in New Jersey. These data also do not allow for comparisons of the severity of contamination among the sites. The information in the data base characterizing detections is based on a yes or no response and does not indicate the concentration of the pollutant in the ground water nor whether it constitutes a violation of MCL standards. However, the extent of known ground-water pollution, not necessarily from documented releases, is indicated by the number of sites with fully characterized plume dimensions. The proximity of these investigations to exposed populations cannot be obtained from the GWPIDB data base. Thus, the data contained in the GWPIDB data base does not support all of the national objectives. Conditions that contribute to this include:

- data have not been collected on a regular basis,
- data are recorded for ground-water investigations and do not specify the regulatory authority for the site CERCLA or RCRA,
- data characterizing the hazardous substance releases are not reported,

# Exhibit B-1

## WASTE SITE SUMMARY FOR SELECTED COUNTIES (1989), NEW JERSEY




Note: Plumes characterized are not necessarily contaminated by VOCs. Other contaminants such as metals and PCBs may be found at the sites.

Source: New Jersey Department of Environmental Protection, Bureau of Ground-Water Pollution Assessment

- the extent of on- and off-site contamination cannot be determined from the data,
- populations at risk were not recorded, and
- the number of sample detections were recorded, but not the concentration of the pollutant in the ground water.

The approach to characterize this indicator should be expanded to include information that is currently managed in paper files. Such additional data will expand the analysis and, combined with the new GIS data base under development, improve the usefulness of the data, particularly in identifying populations at risk from ground-water contamination.

**Revisions to the Indicator Data Collection Process**

Although New Jersey has entered much of its waste site data into automated systems, information summarizing the extent of contamination at the sites is still largely maintained in paper files. Inclusion of these data, as well as other site interpretation data from CERCLA and RCRA project managers, into a computerized data base, would facilitate access to more comprehensive data to support the indicator analysis. Substantial human resources are required to sort and compile this information.

**Conclusions**

Currently available computerized data bases do not contain sufficient data to support the national objectives fully. However, much of the information needed to meet the objectives is available in paper files. Inclusion of this data in the GIS data base under development or other existing data bases would improve access to the data and support its use for indicator reporting.

## C. VOLATILE ORGANIC COMPOUNDS

This section presents the national objectives, approach and findings of the study of Volatile Organic Compounds (VOCs) as indicators of ground-water contamination sources in New Jersey.

**National Objective**

EPA designed the VOC indicator to address the following national objective:[11]

- identify the frequency with which various VOCs are found in ground water.

The following discussion describes the data sources identified in New Jersey to address this objective, and presents and analyzes the data results.

**Description of the Indicator**

Volatile organic compounds typically include solvents and other chlorinated hydrocarbons. They serve as indicators of ground-water contamination resulting from industrial and non-industrial activities. These activities or sources can include landfills, septic systems, spills, hazardous waste sites, leaking underground storage tanks, underground injection control wells, industrial sites generally, and other potential point sources. Volatile organic compounds also serve as surrogates for other compounds

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[11] U.S. EPA, Office of Ground-Water Protection, April 1989, "Indicators for Measuring Progress In Ground-Water Protection," EPA 44016-88-006.

that may be released from these sources. Volatile organic compounds can reach the ground water from improper material handling, and leakage of tanks and industrial equipment at the ground surface.

There is an interest in the level and frequency of VOC contamination due to the possible health hazards posed by VOCs, and other contaminants from similar sources. As a result, measuring changes in VOC concentrations over time may provide a valuable indicator of future trends in drinking water quality resulting from industrial and non-industrial activities.

**Indicator Data Management in New Jersey**

The U.S. Geological Survey (USGS) Water Resources Division, New Jersey District, and the New Jersey Bureau of Ground-Water Pollution Assessment maintain ground-water quality data bases that include VOC data. The NJDEP, Bureau of Safe Drinking Water (BSDW) and the Ocean County Health Department also maintain ground-water data bases that include VOC data. These data are described below.

The USGS, Water Resources Division, New Jersey District has collected VOC data for several New Jersey counties for various projects such as hazardous waste studies, county-level water quality studies, and regional aquifer assessments. The data base containing VOC information is called the National Water Information System (NWIS).[12] As part of these studies, ground-water samples are collected at the wellhead and have been tested for as many as 36 constituents. Information recorded for each sample includes location (e.g., latitude and longitude), data reliability, primary use of water (e.g., public, industrial, etc.), and aquifer code information. Most of the VOC data within the data base were reported during the last ten years, and most sites were sampled and analyzed only once.

The New Jersey Bureau of Ground-Water Pollution Assessment maintains ground-water quality data for seven counties (Camden, Hunterdon, Monmouth, Morris, Ocean, Passaic and Somerset) in the Ground-Water Pollution Indicator Data Base (GWPIDB). Specific VOC constituent information is not provided on the GWPIDB; the data base tracks whether or not a volatile organic compound was detected (i.e., the specific compound is not recorded). The data tracked in the GWPIDB generally represent one-time sampling events at the site and are typically 18 months to two years old. The information collected and maintained on the GWPIDB, as well as an explanation of the data fields, is provided in Appendix D to this report.

The NJDEP, Bureau of Safe Drinking Water (BSDW) maintains a VOC file that includes all analytical testing results for VOCs in public water supply wells in the NJPWF data base (also called the "A-280" file, see Section III A). A sample data collection form for these compounds is provided in Appendix A to this report.

**Approach for Characterizing the Indicator**

EPA chose to limit the analysis of VOC data to the USGS NWIS data base for samples collected in the counties of Camden, Hunterdon, Monmouth, Morris, Ocean, Passaic and Somerset. EPA chose this data base because it is currently the best data source available in that it provides:

- the greatest amount of data in one data base;
- sites identified with geographic locators (i.e., latitude and longitude);
- the greatest number of sites in one data base;
- the greatest consistency in collecting, analyzing and reporting data;
- specific VOC concentrations;
- the broadest State coverage;

[12] The NWIS data base was previously referred to as the Water Data Storage and Retrieval System or "WATSTORE."

- the broadest time coverage;
- existing data base documentation; and,
- existing data base personnel support.

EPA chose not to use the other identified data bases because the Ocean County data base was found to be difficult to access, and the Bureau of Safe Drinking Water was unable to provide analysis and summary data of it's NJPWF data base due to budget constraints. In addition, the NJPWF VOC data reflect the analysis of finished water rather than raw ground water, and, therefore, do not necessarily represent the quality of ground water at the wellhead.

EPA requested the following information from NWIS for the seven counties analyzed:

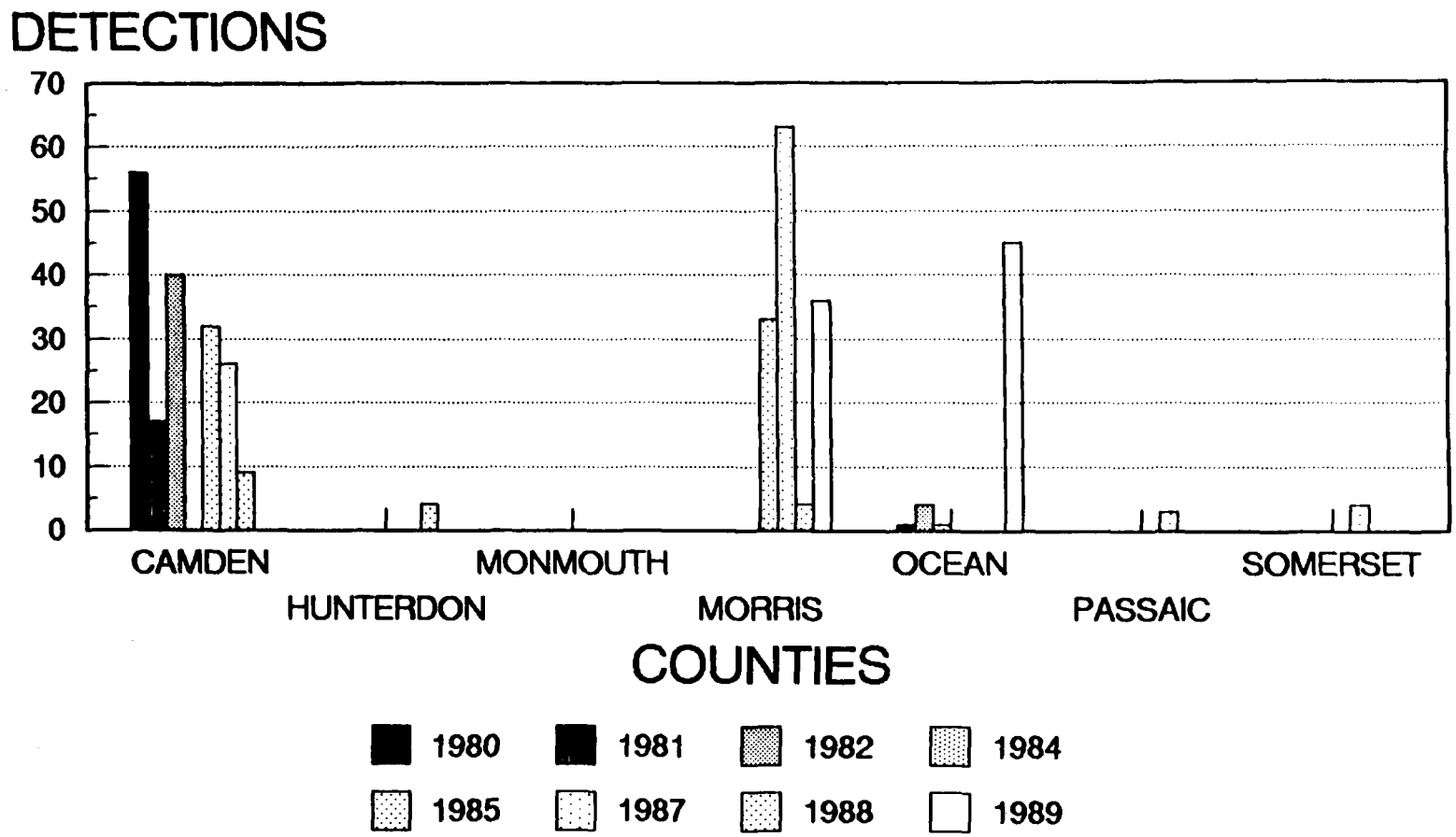
- number of wells monitored for VOCs,
- number of samples in which VOCs have been detected,
- number of samples in which MCLs or other health-based thresholds have been exceeded, and
- yearly trends in VOC monitoring practices and detections.

**Study Results and Interpretation of Data**

Over the 1980 to 1989 period (data were not available from NWIS for years 1983 and 1986) a total of 395 VOC detections were recorded for all seven counties, out of a total of 7,382 sample analyses. The analysis indicates that there were 109 samples with VOC concentrations that exceeded health-based thresholds collected in Camden, Morris and Ocean Counties. The other four counties (i.e. Hunterdon, Monmouth, Passaic and Somerset) had no detections that exceeded health-based thresholds. No wells were sampled in Morris County for the years 1980 through 1984, or in Ocean County for the years 1980, 1983, 1985, 1986, 1987 and 1988. In Hunterdon, Monmouth and Passaic Counties, samples were taken and analyzed for only one of the years of record. Summary VOC data for individual compounds are provided in Appendix H, Table H-1 through H-7.

Exhibit C-1 graphically presents the VOC detections for the seven counties. Trends in VOC detections over time cannot be made based on these data since samples were taken from wells that, for the most part, were tested only once. Therefore, increases or decreases in VOC detections may result from samples being taken in different regions of a county. In addition, the number of wells sampled and the number of samples analyzed varied from year to year and from county to county. Most of the variation in the number of sample detections from year to year and between counties (shown in Exhibit C-1) can be explained by the differences in the number of samples analyzed. For example, in Camden County in 1980, 66 wells were sampled and a total of 949 analyzes were completed on the 73 samples collected. In 1981, 17 samples were collected from 17 wells and 253 analyzes were completed. The percentage of VOC detections per the number of analyzes completed was 5.9 percent and 6.7 percent for the years 1980 and 1981 respectively, which is not a significant change. Based on the above relationship, the frequency of specific VOC detections and health-based threshold exceedances can be estimated as a function of the number of samples analyzed. Exhibits C-2 through C-4 graphically present the frequency of detection for the most common VOCs during the 1980 to 1989 period for Camden, Morris and Ocean Counties. These frequencies do not necessarily represent the true VOC levels in the county's ground water. Multiple samples were frequently collected from the same wells that were suspected of contamination which may have biased the results. The distribution of VOCs in ground water at the sample locations may not adequately represent the actual distribution of VOCs in ground water county-wide or state-wide.

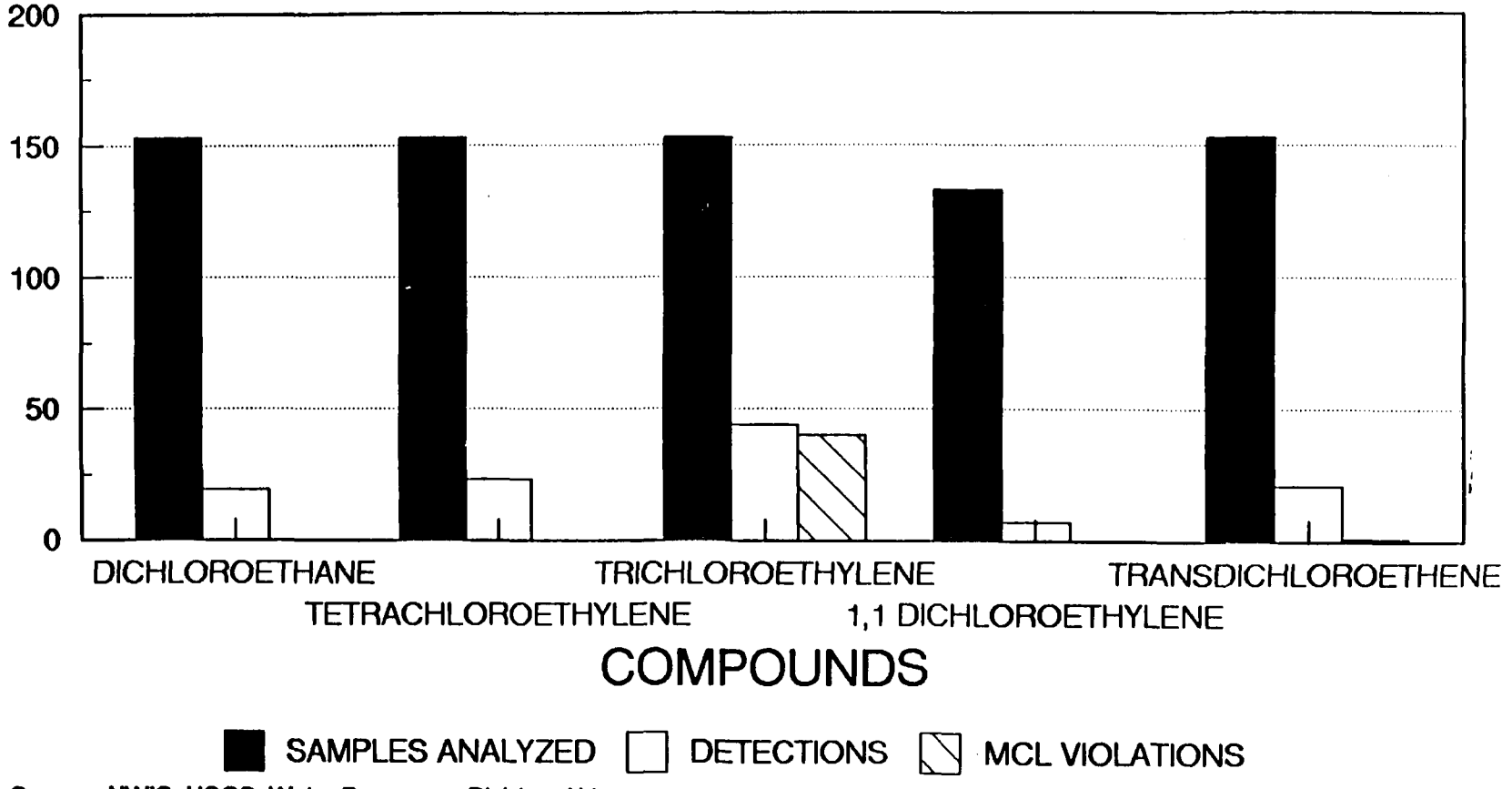
# Exhibit C-1
# SUMMARY OF VOC DETECTIONS FOR SELECTED COUNTIES IN NEW JERSEY




Note: Data were not available in NWIS for years 1983 and 1986.

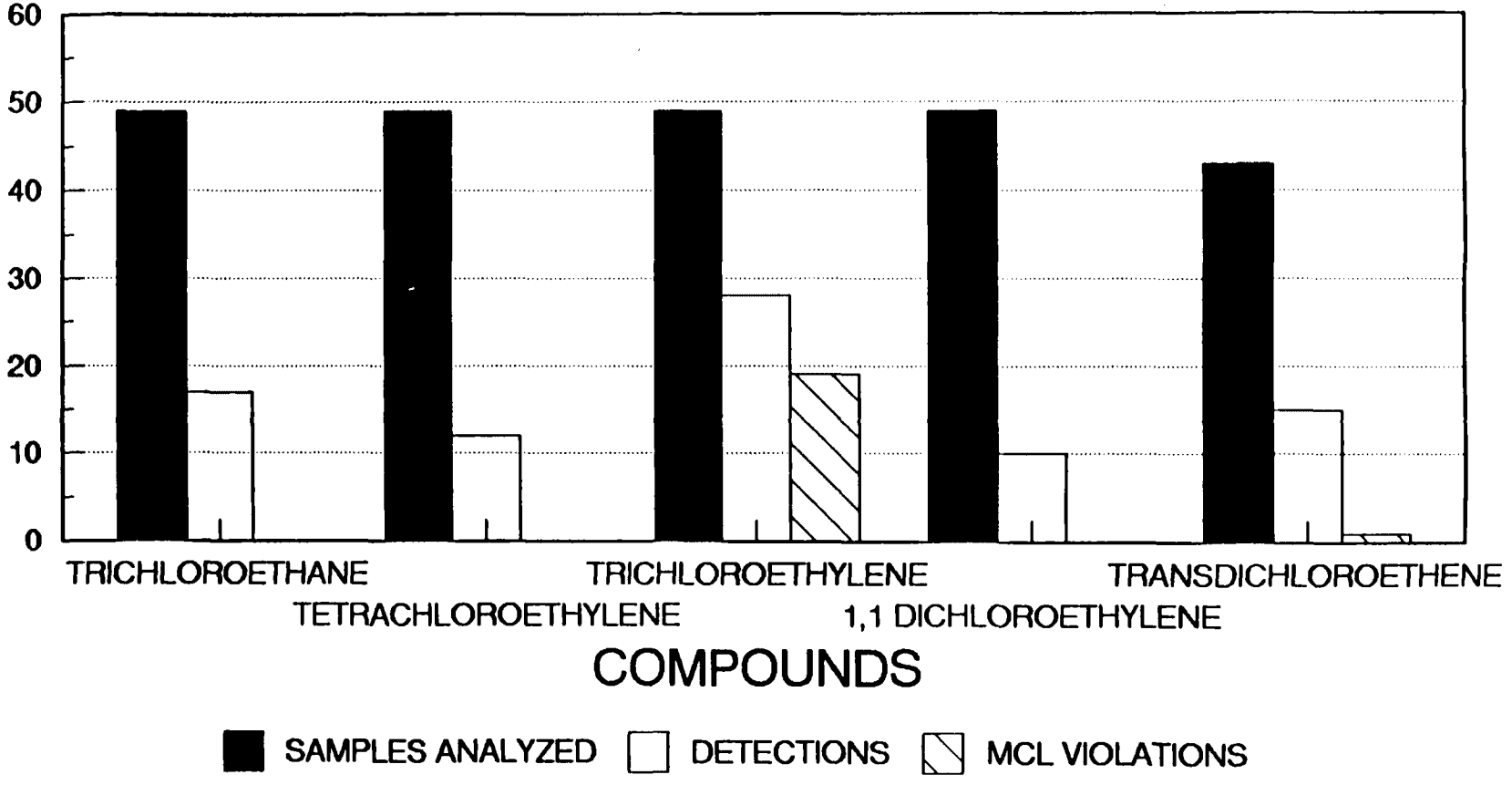
Source: USGS, Water Resources Division, New Jersey District National Water Information System (NWIS)

# Exhibit C-2
# FREQUENCY OF SPECIFIC VOC DETECTIONS FOR CAMDEN COUNTY, NEW JERSEY (1980-1989)



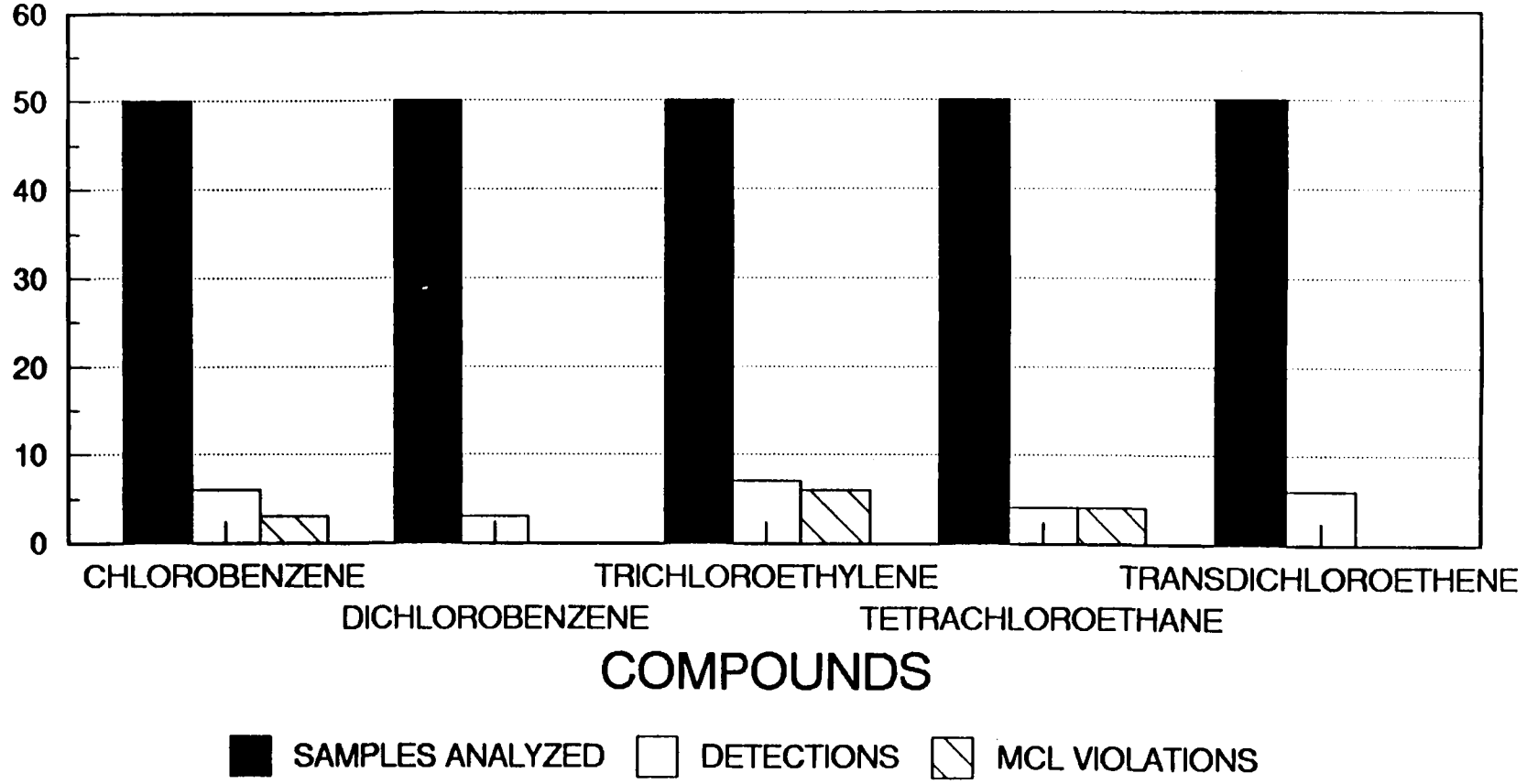

Source: NWIS, USGS, Water Resources Division, NJ
Sample analyses were not completed for each year
Compounds were those most frequently detected.

# EXHIBIT C-3
# FREQUENCY OF SPECIFIC VOC DETECTIONS
# FOR MORRIS COUNTY, NEW JERSEY (1980-1989)




Source: NWIS, USGS, Water Resources Division, NJ
Sample analyses were not completed for each year
Compounds were those most frequently detected.

# EXHIBIT C-4
# FREQUENCY OF SPECIFIC VOC DETECTIONS
# FOR OCEAN COUNTY, NEW JERSEY (1980-1989)




Source: NWIS, USGS, Water Resources Division, NJ
Sample analyses were not completed for each year
Compounds were those most frequently detected.

The pilot study did show that:

- VOC data are available at the county level,
- VOC data lend themselves to visual representation, and
- the frequency of detection of individual VOCs remained fairly consistent across several of the counties.

However, there are many uncertainties regarding the data and the ability to make valid interpretations concerning significant trends. Conditions that contribute to this include:

- data are limited in geographic coverage;
- sampling is not consistent in geographic coverage;
- sampling is not consistent over time;
- sampling, for the most part, is on a one time basis;
- non-uniformity in securing and analyzing samples;
- sample depths vary; and
- number of samples with detections and the number of samples in which

MCLs that have been exceeded were recorded instead of the number of wells with detections or MCL violations. Thus, the usefulness of these data are minimized as indicators of ground-water quality within the counties themselves, as well as across the state. The frequency of specific VOC detections and MCL exceedances as a function of the number of samples analyzed can be determined, but this analysis does not meet the national objective to "identify the frequency with which various VOCs are found in ground water," because of the uncertainties inherent in the data.

**Revisions to the Indicator Data Collection Process**

The approach to characterize this indicator can be expanded to include VOC information that is currently managed in computer data bases or paper files for CERCLA and RCRA waste sites and NJDEP permitted facilities. Use of these additional data bases, together with VOC information available from the BSDW data base, will expand the information available to characterize this indicator.

Other information on VOCs provided to NJDEP can be sorted and included in the analysis for the 305(b) report. This information may include testing from private drinking water wells, ground-water data collected during the design of new septic systems, results of the cleanup of underground storage tanks, and ground-water data at industrial sites.

**Conclusion**

Data on VOCs are available at the county-level; however, certain counties appear to have a greater quantity of VOC data than others. Furthermore, apparent trends in VOC detections in some of the counties may be explained by differences in the number of samples taken and analyzed. Thus, data on VOCs, maintained in the NWIS data base are not sufficient to support the national objective fully. A more thorough and consistent VOC sampling and analysis program should be developed to determine trends in VOC levels State-wide.

## D. NITRATES

This section presents the national objectives, approach, and findings of the study of nitrates as an indicator of area-wide ground-water contamination sources in New Jersey.

**National Objective**

EPA collected nitrate data in New Jersey in an effort to support the following two national objectives:[13]

- identify the pattern and level of ground-water quality with respect to the area-wide sources throughout the country by identifying the geographic pattern of contamination on a county-by-county basis over a given time span, and

- display State-by-State trends over time in the area-wide quality of ground-water by identifying the number of counties, State-by-State where ground-water concentrations of nitrates are improving versus those where they are deteriorating.

The following discussion describes the data sources identified in New Jersey to address these objectives and presents and analyzes the data results.

**Description of the Indicator**

Nitrates are commonly found in ground water in regions that are affected by area-wide sources of contamination, such as agriculture and septic systems. Nitrates can leach into ground water from normal agricultural practices (e.g., the use of nitrogen fertilizers) and wastewater disposal because of their high solubility in water and their inability to adsorb to soil particles. The detection of nitrates also can often indicate the possible presence of other ground-water contaminants. For example, a correlation between areas susceptible to nitrate contamination and those susceptible to pesticide contamination has been suggested. This is likely because chemicals that leach into ground water tend to be water soluble, poorly adsorbed by soil, and have a partial or full negative charge at ambient pH. Some pesticides (such as the triazine and acetanilide herbicides and carbamate insecticides) share these properties with nitrates. In one study completed in New Jersey, the samples collected showed higher nitrate concentrations in wells where pesticide residues were also detected.[14]

Approximately fifty percent of the population in New Jersey relies on ground water for drinking water supply, and, in many areas of New Jersey, ground water is the only available source of drinking water. As a result, measuring changes in nitrate concentrations over time may provide a valuable indicator of future trends in drinking water quality. In addition, high nitrate concentrations in drinking water supplies are a recognized human health concern, especially for young children. Exposure to high levels of nitrate can result in methemoglobinemia or "blue-baby syndrome." As a result, the primary drinking water standard for nitrate has been set at 10 mg/l (as nitrogen).[15]

**Indicator Data Management in New Jersey**

Nitrate data have been collected as part of routine ground-water analysis activities by several New Jersey agencies. For this study, EPA identified two principal sources of nitrate data: (1) the U.S. Geological Survey NWIS data environment; and (2) nitrate data from the records maintained for private well analyses in Ocean County. This latter Ocean County data base was identified as a representative source for private drinking water well data.

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[13] U.S. EPA, Office of Ground-Water Protection, April 1989, "Indicators for Measuring Progress In Ground-Water Protection," EPA 44016-88-006.

[14] Louis, Judith B. and Eric Vowinkel. 1989. "Effect of Agricultural Chemicals on Ground-Water Quality in the New Jersey Coastal Plain."

[15] 40 CFR Part 141.11.

The NWIS data base contains data that have been compiled since 1980. The following types of information are collected in the data base: location (i.e., latitude and longitude), analytical results (i.e., water quality parameters) and physical characteristics (e.g., pH, conductivity and temperature). The USGS and the New Jersey Geological Survey work together on ground-water data collection activities that vary in intensity from year to year. Data from these joint studies are managed in the NWIS data base. In the past, as many as 100 wells have been sampled and analyzed for a wide variety of inorganics and organic constituents, including nitrates, and physical parameters. In contrast, only 26 wells were sampled in FY90. In addition, the geographic focus of the ambient monitoring program varies. Sampling activities in FY90 were focused on the Highland physiographic province.

Ocean County data are managed at the County Health Department office. Over 1,200 records for private wells in Ocean County are maintained; these data have been collected since May 1987. Water quality information is collected for 26 constituents, generally consisting of the New Jersey MCL constituents (including nitrates). Latitude and longitude are not tracked; however, Ocean County uses a coding system indicating the municipality for each property owner who reports well information.

In addition to the NWIS and Ocean County data sources, the Bureau of Safe Drinking Water (BSDW) tracks MCL compliance results, including federal MCL violations for nitrate. This data source is further described in Section III-A of this report. Other sources of nitrate indicator information in New Jersey are described in Appendix I.

**Approach for Characterizing the Nitrate Indicator**

After reviewing the data sources described above, EPA concluded that data retrievals from the NWIS data base would provide the best available source of information to track trends in nitrate concentrations in New Jersey and, therefore, chose NWIS as the sole data source for characterizing the nitrate indicator.

EPA identified the NWIS data base as the best data source available in that it provides:

- the greatest amount of data in one data base,
- sites identified with geographic locators,
- the greatest number of sites in one data base,
- the greatest consistency in collecting, analyzing and reporting of data,
- the broadest State coverage,
- the broadest time coverage,
- existing data base documentation, and
- existing data base personnel support.

The obstacles encountered with the Ocean County data base were due to Ocean County's inability to provide, through their contractor, the needed retrieval and analysis support their data management system required.

EPA collected data retrievals from the NWIS data base for the counties of Camden, Hunterdon, Monmouth, Morris, Ocean, Passaic and Somerset. The retrievals consisted of the following for the years 1980 through 1989:

- wells monitored for nitrates,
- number of samples taken and analyzed for nitrates from each well, and
- nitrate levels reported for each sample.

***Study Results and Interpretation of Data***

Based on the data retrieved from NWIS, EPA derived four pieces of information to characterize the nitrate indicator in the counties for each of the years 1980 through 1989:

- number of wells monitored for nitrates,
- number of samples taken and analyzed for nitrates,
- number of samples with detectable levels of nitrates, and
- number of samples with nitrate concentrations in excess of the drinking water standard (10 mg/l).

EPA's analysis found that nitrate detections were highest in Ocean County in 1982, followed by much lower detections in the following years. Morris County has experienced an increase in nitrate detections in recent years. Camden and Morris County detections have been consistently higher than in Passaic or Somerset Counties. However, these trends shown in Exhibit D-1 may be further explained by the relationship between nitrate analyses and detections, as is illustrated for Morris County in Exhibit D-2. Both the number of nitrate samples and detections in Morris County increased for the years 1985, 1987 and 1989, while the relative difference between the number of samples and the number of detections remained approximately the same. Sampling and detections were lower for 1986 and 1988. This suggests a relationship between the number of samples analyzed and the number of detections. Additionally, Passaic and Somerset Counties were only sampled during the last three years of the eight years of record. A total of 26 samples were collected from Passaic and Somerset Counties during this period, while 219 samples were collected from Camden and Morris Counties. As a result, the higher number of detections for Camden and Morris Counties may be explained by the greater number of analyses. The nitrate data summary for the seven counties is presented in Appendix J to this report.

Two exceedances of the nitrate drinking water standard were recorded for Ocean County for the entire period of record. The remaining six counties had no exceedances of the nitrate drinking water standard for this period of time.

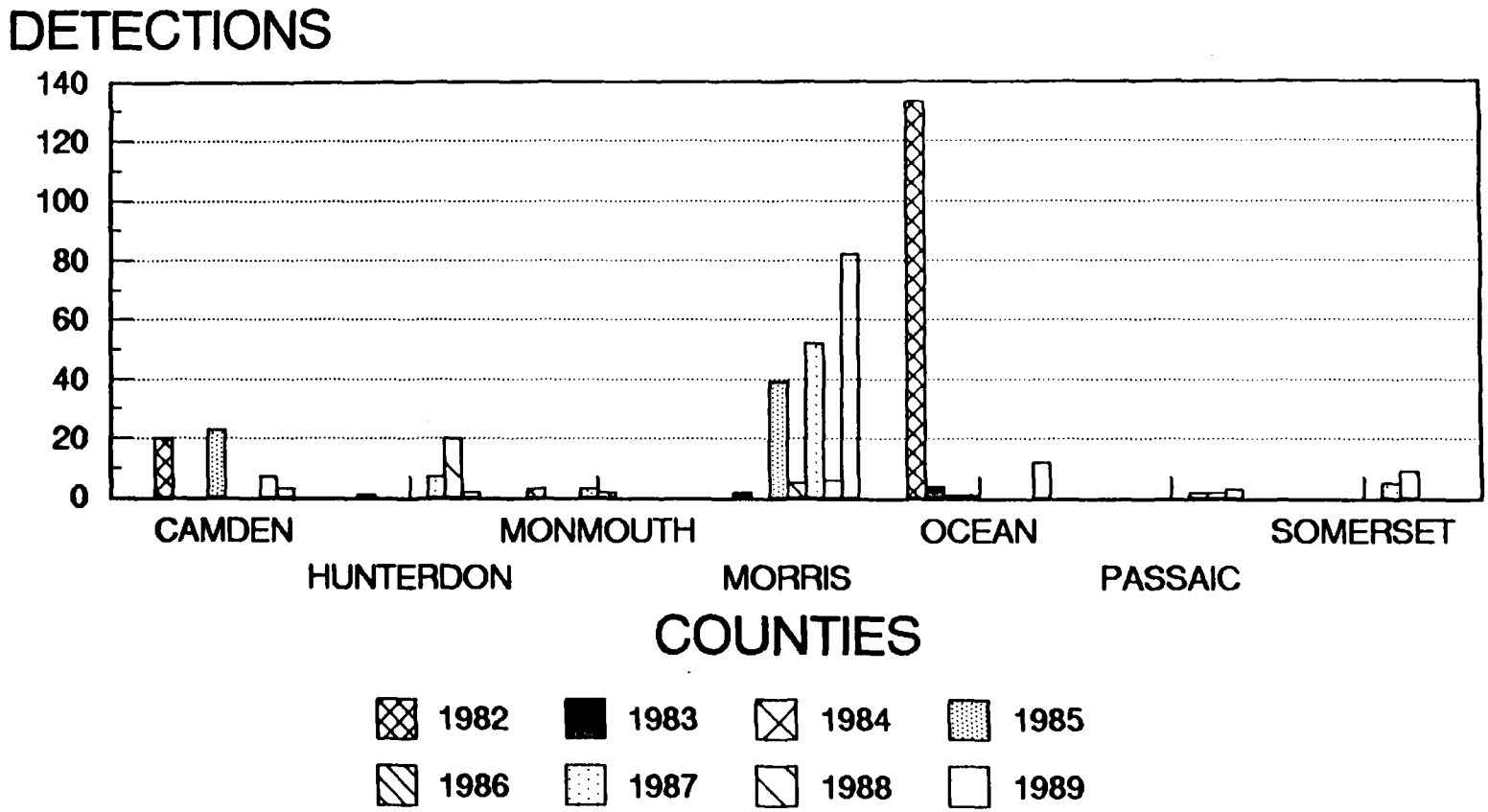
The pilot study demonstrates that:

- nitrate data are available at the county level;
- nitrate data do lend themselves to visual representation; and,
- nitrate data would allow, with time, for comparison among counties and within a county across time.

However, there are many unknowns concerning the data which make the identification of significant trends problematic. Conditions that contribute to this include:

- data are limited in geographic coverage;
- sampling is not consistent in geographic coverage;
- sampling is not consistent over time;
- sampling, for the most part, is on a one-time basis and repeat sampling locations could not be identified from the data base;
- nonuniformity in securing and analyzing samples; and
- sampling depths vary.

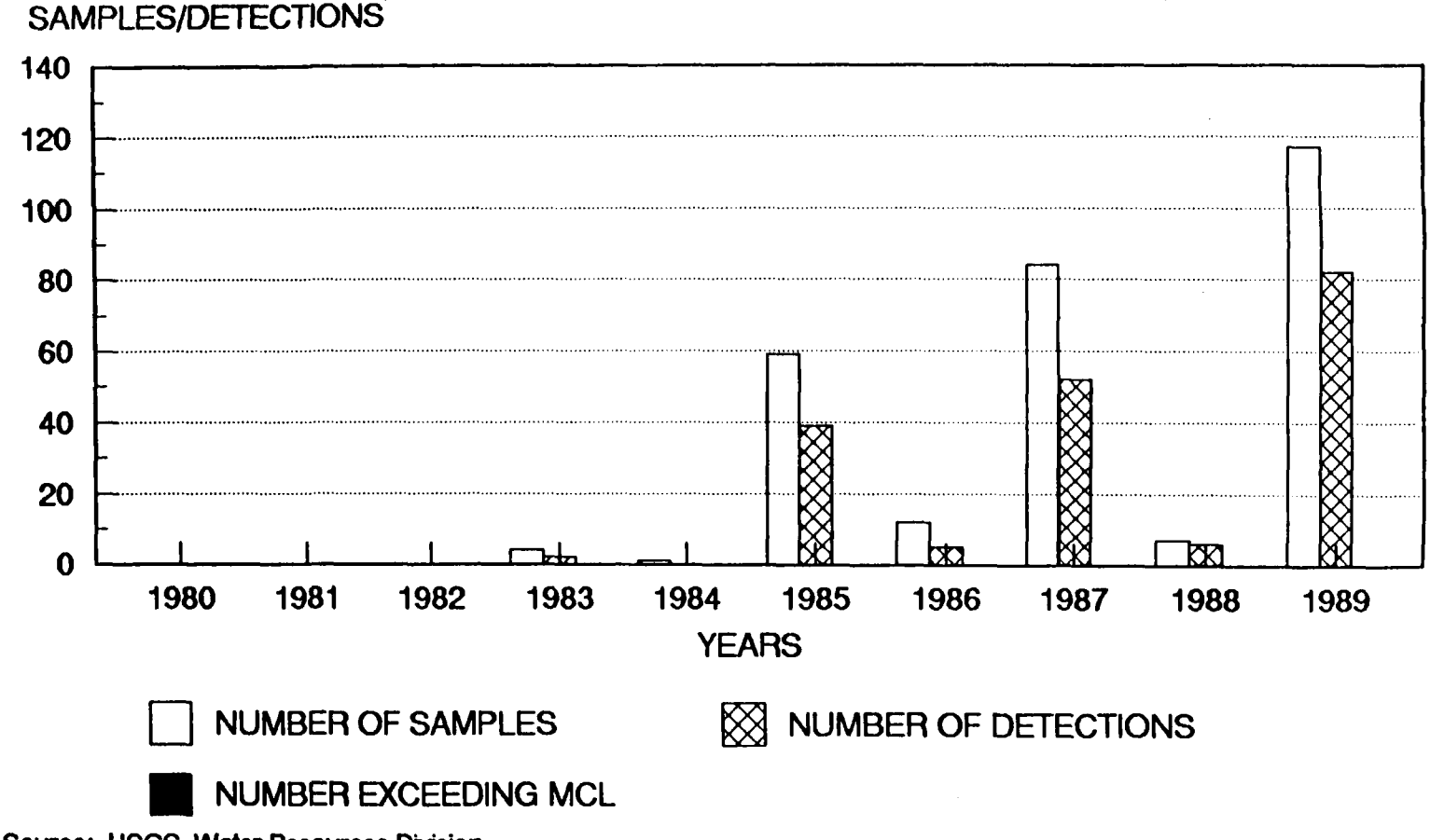
# Exhibit D-1
# NITRATE DETECTIONS FOR SELECTED COUNTIES IN NEW JERSEY




Note: This exhibit depicts the number of ground water samples in which quantifiable levels of nitrate were detected.

Source: USGS Water Resources Division, New Jersey District National Water Information System (NWIS)

# Exhibit D-2
# NITRATE ANALYSES AND DETECTIONS
# MORRIS COUNTY, NEW JERSEY




Source: USGS, Water Resources Division, New Jersey District National Water Information System (NWIS)

The approach selected to collect and analyze New Jersey nitrate data focused on the use of data readily available from the USGS NWIS data base. Broad generalizations can be made from the New Jersey nitrate data, but it is necessary to understand that this approach does not meet the national objective to "display county-by-county trends over time in the area-wide quality of ground water by identifying the number of counties where ground-water concentrations of nitrates are improving versus those where they are deteriorating." For the reasons stated above these data should be analyzed carefully in support of their use as indicators of ground-water quality within the counties themselves as well as across the State.

**Revisions to the Indicator Data Collection Process**

In order to collect data to meet the national objective and effectively track trends in the 305(b) reporting environment, the following recommendations are made based on the experience gained in this pilot study:

- maintain consistency in sample taking,
- maintain consistency in sample analyses,
- identify and establish an ambient monitoring well network,
- sample on an annual basis,
- develop and use a standard data collection format,
- use data bases that are consistent State-wide, and
- use data bases that are maintained by one office or bureau.

If these recommendations can be implemented on a statewide basis, with time, trend analysis would be possible on the national level.

**Conclusions**

The New Jersey nitrate data can be used as a broad bush representation of nitrate trend analysis if the limitations are identified. Until such time as complete county-by-county data are available, the recommendation is to accept the current data. However, this approach does not fully meet the national objectives for the nitrate indicator.

## E. EXTENT OF AGRICULTURAL PESTICIDE USE

This section presents the national objectives, approach, and findings of the study of agricultural pesticide use as an indicator of ground-water contamination in New Jersey.

**National Objective**

EPA designed the agricultural pesticide use indicator to support the following objectives:[16]

- identify the relative intensity of pesticide use on a county-by-county basis,
- identify the relative vulnerability to ground-water contamination on a county-by-county basis, and

[16] U.S. EPA, Office of Ground-Water Protection, April 1989, "Indicators for Measuring Progress In Ground-Water Protection," EPA 44016-88-006.

- provide an indication of where potential ground-water problems from pesticide use might occur, based on geographic patterns of use and vulnerability.

The following discussion describes the manner in which this study was able to address the first objective with agricultural pesticide usage data collected in New Jersey. The second and third objectives cannot be addressed until such time as ground-water vulnerability studies are completed for New Jersey.

**Description of the Indicator**

The use of pesticides, primarily associated with agricultural practices, has been identified as a potential source of ground-water degradation. The potential degradation of ground water due to the application of pesticides in New Jersey is an important issue for several reasons:

- approximately fifty percent of the population of New Jersey relies on ground water for drinking water supply, and, in many areas of New Jersey, ground water is the only available source of drinking water;
- eighteen percent of the land on New Jersey is devoted to agriculture, the major portion of this is cropland;[17]
- the diversity of agricultural crops has a corresponding diversity in the amounts and types of pesticides used;
- New Jersey is physically (geographically) a small state, therefore, agricultural areas are intermingled in rural, suburban and urban regions;
- many agricultural chemicals are also used in residential areas; and,
- much of the farm land in New Jersey is being developed, and the water supply for these new residential areas often comes from domestic wells that are at risk from agricultural pollution.

**Indicator Data Management in New Jersey**

In 1986, the NJDEP Bureau of Pesticide Operations (BPO) conducted a survey of private agricultural pesticide applicators to collect 1985 pesticide usage data. The applicators were requested to identify the pesticides used, the number of acres treated, the method of application, and the municipality where the pesticide was applied. A total of 2,957 responses to the survey were received; of these, 1,722 respondents applied pesticides to their crops.

BPO enforcement personnel also conducted follow-up investigations (i.e., phone calls or farm inspection visits) to evaluate the accuracy of the data reported. Data obtained from this survey are maintained by the BPO in a dBase III Plus data base. Summary information is maintained in Lotus 1-2-3 files.

BPO also summarized and entered the data from this survey into a Geographic Information System (GIS). Using the mapping capabilities of this system, useful information such as quantitative descriptions of the locations of pesticide applications in relation to areas where there are vulnerable aquifer systems, potable water intakes or other environmental concerns, could be obtained, although aquifer vulnerability mapping in New Jersey is not yet complete. Other uses for these data include:

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[17] New Jersey Department of Agriculture, 1986.

- supporting the State in developing ground-water protection strategies,
- reviewing applicants for specialized pesticide use,
- imposing restrictions on certain pesticides in areas where problems may occur,
- USGS projects to monitor pesticide residues in ground and surface water,
- NJDEP evaluations of areas where non-point source runoff from agricultural areas may be affecting surface water quality, and
- NJDEP studies of the impact of long-term exposure of farmers to organophosphorus insecticides.

Reports prepared by the State of New Jersey that summarize the information obtained from the 1985 private use survey, and other sources of information on pesticide use in New Jersey are described in Appendix K of this report.

A second survey was conducted in 1989 to collect 1988 pesticide usage data. The primary difference between the 1985 and 1988 data was the more detailed breakdown of crop codes used in the survey completed in 1989. A total of 3,087 responses were received from the second survey; of these 1,703 respondents applied pesticides to their crops.

A commercial applicator survey was also conducted that covered the 1985 calendar year. This survey requested the same types of information as the private applicator surveys, with the exception that locations of the pesticide application practices were not requested.

**Approach for Characterizing the Indicator**

The BPO data base was chosen by U.S.EPA to characterize the pesticide usage indicator because it is the only data source available. The data base contains data collected from 1985 and 1988 which includes:

- summaries of pesticide application rates on a county-by-county basis, and
- a subset of pesticide types.

Summaries of pesticide application rates for each pesticide include:

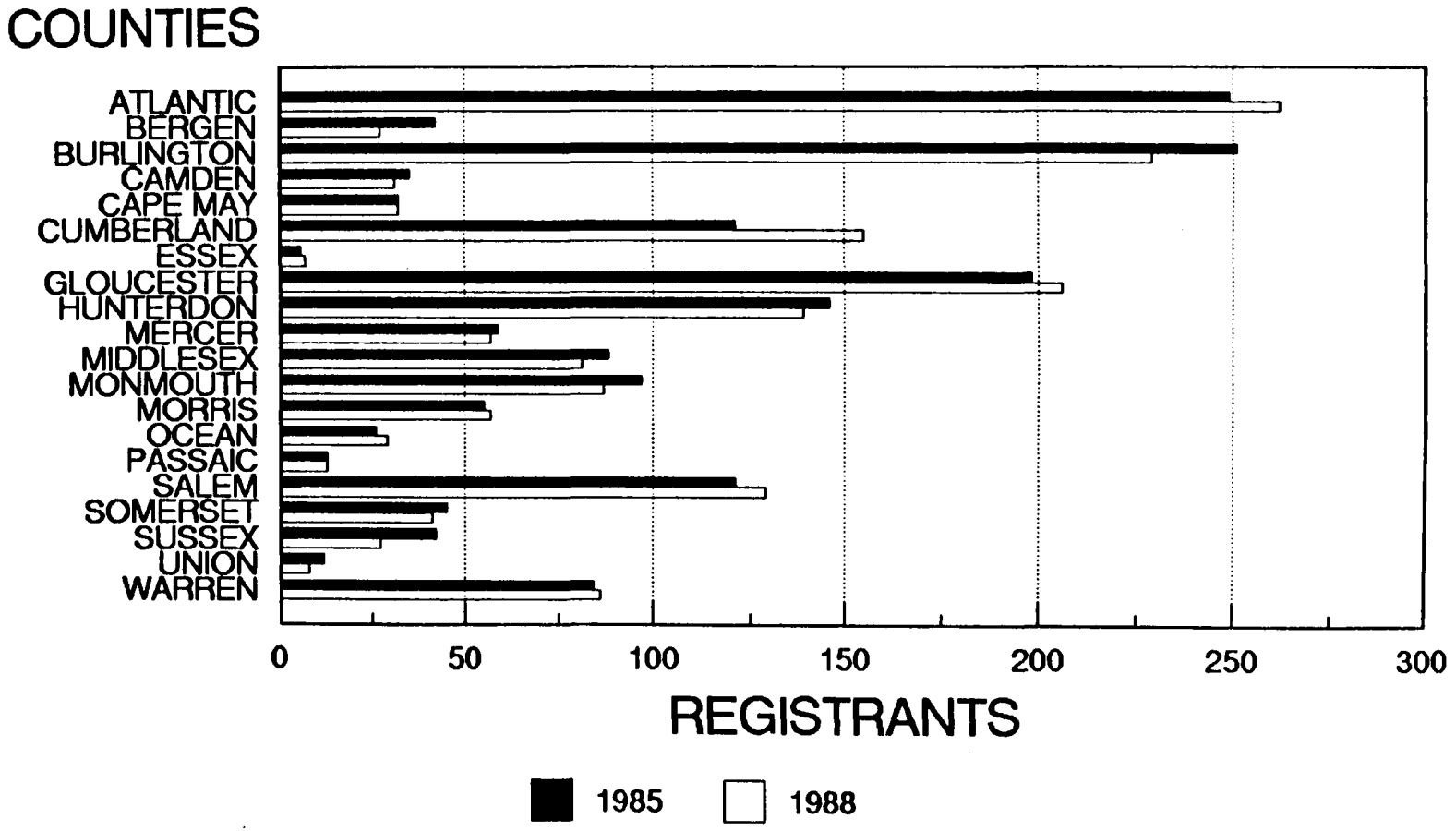
- the number of registrants using the pesticide,
- amount of active ingredient applied, and
- estimates of the application rates for each pesticide on a county-by-county basis.

**Study Results and Interpretation of Data**

The 1985 and 1988 registered private applicator data were provided by the NJDEP Pesticide Control Program. The 1985 survey gathered information characterizing pesticide use information for 1,722 farming operations located in 243 of the states 567 municipalities (about 75 percent of the State's farming operations). Smaller growers who do not use restricted pesticides were not included in this survey. In 1988, the total number of registrants dropped to 1,703, a 1.1 percent decrease from the number of registrants in 1985. Exhibit E-1 shows the total number of registrants by county for 1985

## Exhibit E-1

## TOTAL PRIVATE PESTICIDE APPLICATOR REGISTRANTS BY COUNTY IN NEW JERSEY




Source: New Jersey Department of Environmental Protection, Bureau of Pesticides

and 1988. Tracking the number of registrants may support analyses of trends in pesticide usage; however, the relationship between the number of registrants using a specific pesticide and the level of pesticide use is unclear because only two years of data are available.

Exhibits E-2 through E-8 provide a breakdown of pesticides by type, the number of registrants in each county and the amount of active ingredients applied for the years 1985 and 1989.

Exhibit E-9 shows the total amount of pesticide applied for each pesticide group for the years 1985 and 1989. The total amount of active ingredients applied increased from 1,563,967 pounds in 1985 to 1,824,803 pounds in 1989. The increase in the total amount applied is primarily due to increases in the amounts of fungicides and insecticides applied. The average application rate decreased from 13.7 lbs/acre in 1985 to 9.7 lbs/acre in 1988. Analysis of the data revealed that the total amount of active ingredients applied increased even though the amount applied per acre decreased because more land was treated with pesticides by private applicators in 1988.

Summary data are provided in Appendix L, Tables L-1 through L-9. Hudson County was not included in the data base because of the limited number of farms in the county.

The data collected by the BPO provides sufficient information to assess pesticide usage trends in New Jersey. However, the data do not support detailed analysis of the factors underlying the trends, such as:

- weather patterns,
- changes in cropping practices, and
- long term trends in land use.

The BPO has indicated that these surveys will be continued in future years, which will provide a long term record of pesticide usage in New Jersey.

Analysis of the 1985 commercial applicator survey was not performed. This data base includes the same data elements as the private use survey, but does not include any geographic information, therefore, areas affected by commercial applications cannot be determined.

**Suggested Revisions to Indicator Data Collection Process**

EPA found a need for few revisions in data management practices for this indicator. The data provided by the BPO were maintained on a dBase III Plus data base with additional summary information on Lotus 1-2-3 files. This computer format provided easy access to the data for analysis of the information. The data contained on the files were limited and specific to the needs of this effort, which minimized data compilation and analysis efforts.

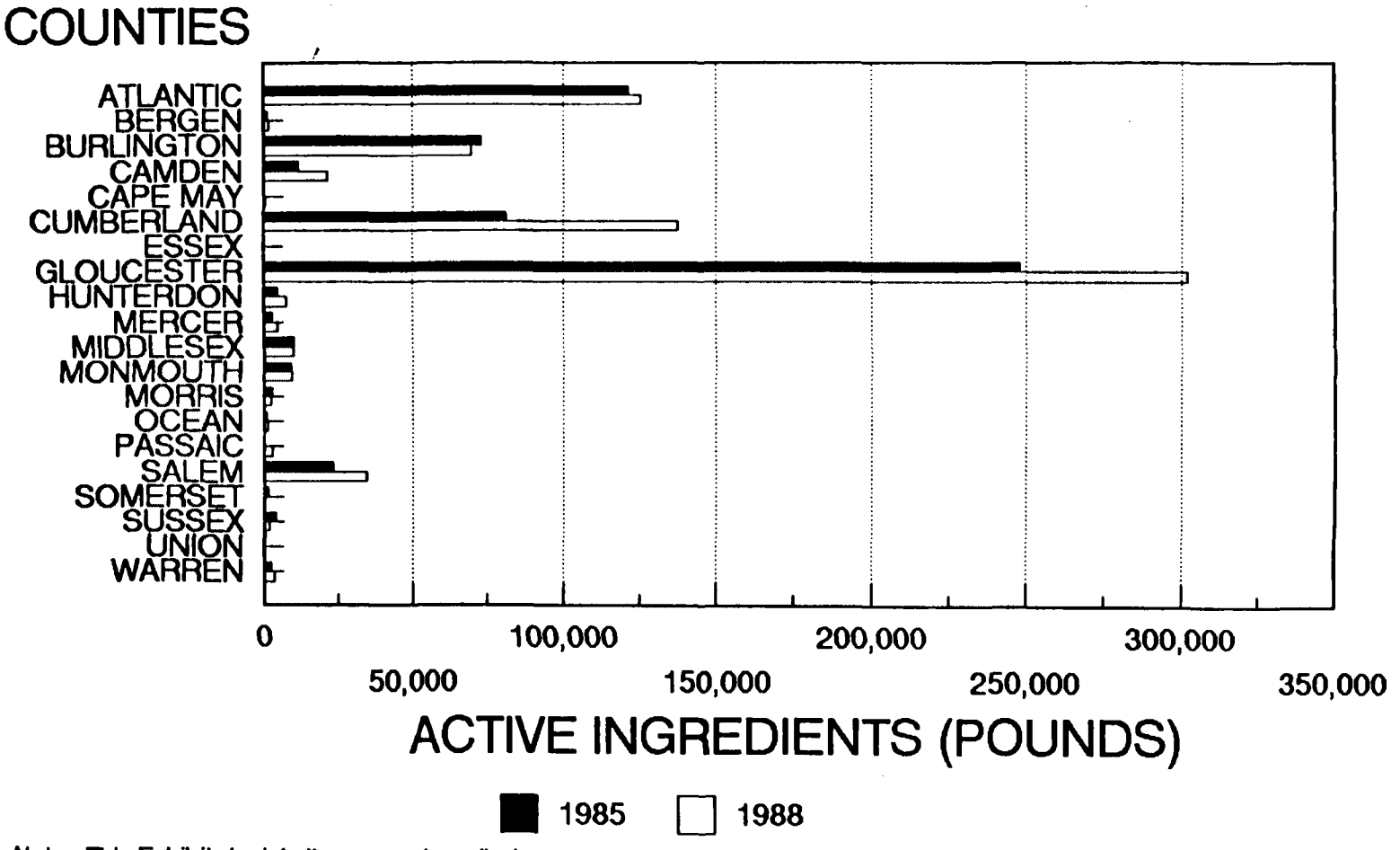
However, data collection efforts in future surveys can be expanded to include information on ground-water quality in the areas of pesticide application, and can be expanded to include cropping histories and rotations.

**Conclusions**

The data collected by the BPO is sufficient to analyze pesticide usage trends by private applicators in New Jersey. In addition, these surveys are to be continued in the future, which will provide data for long term trend analysis. Combining the pesticide usage data with ground-water quality and contamination vulnerability data, can provide an indication of where potential ground-water problems from pesticide use might occur. However, until such time as ground-water vulnerability studies are complete, the national objectives concerning geographic distributions of vulnerability and pesticide usage cannot be fully met.

## Exhibit E-2

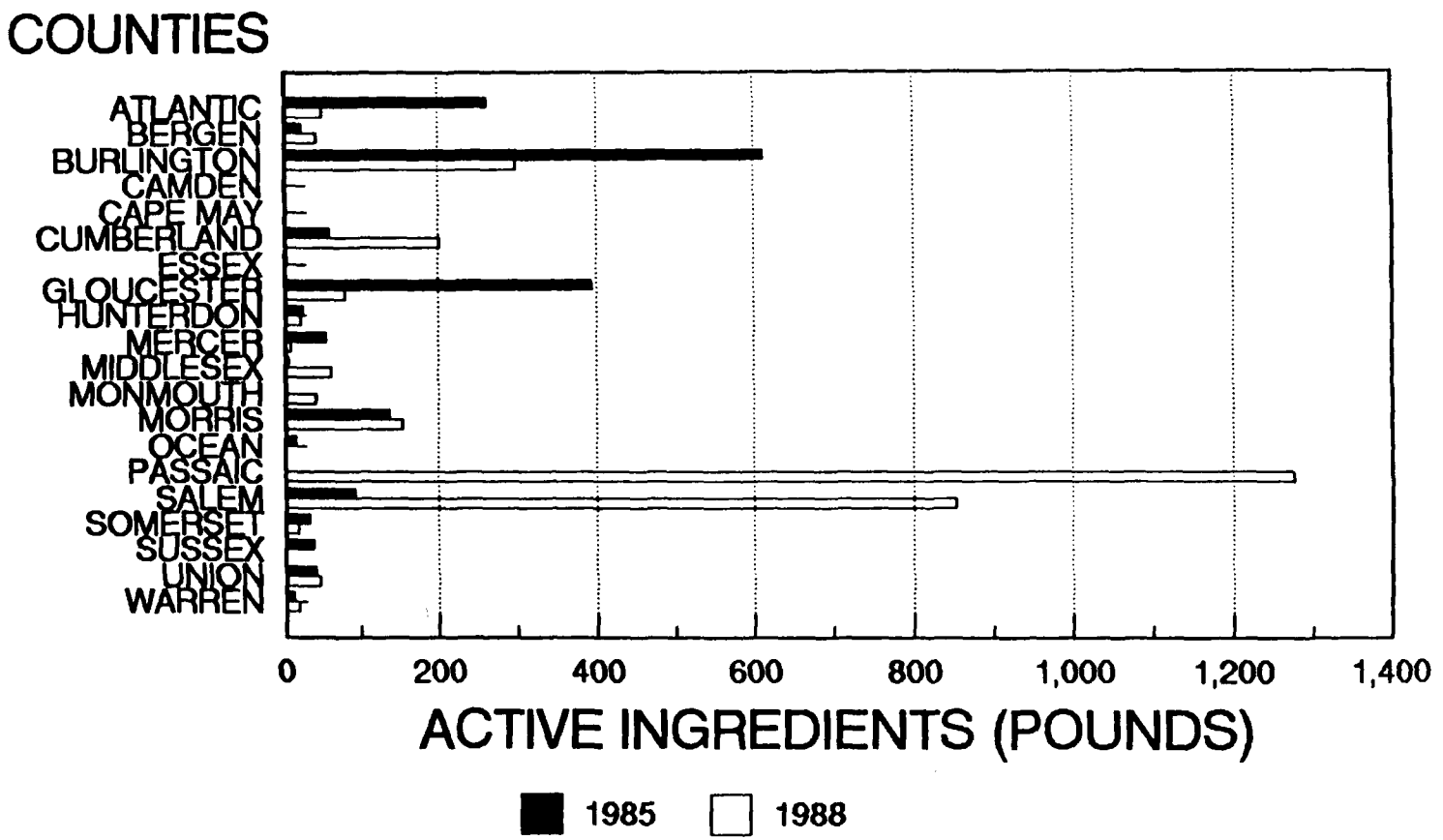
## FUNGICIDES APPLIED BY COUNTY IN NEW JERSEY




Note: This Exhibit depicts the amount applied by private pesticide applicators.

## Exhibit E-3

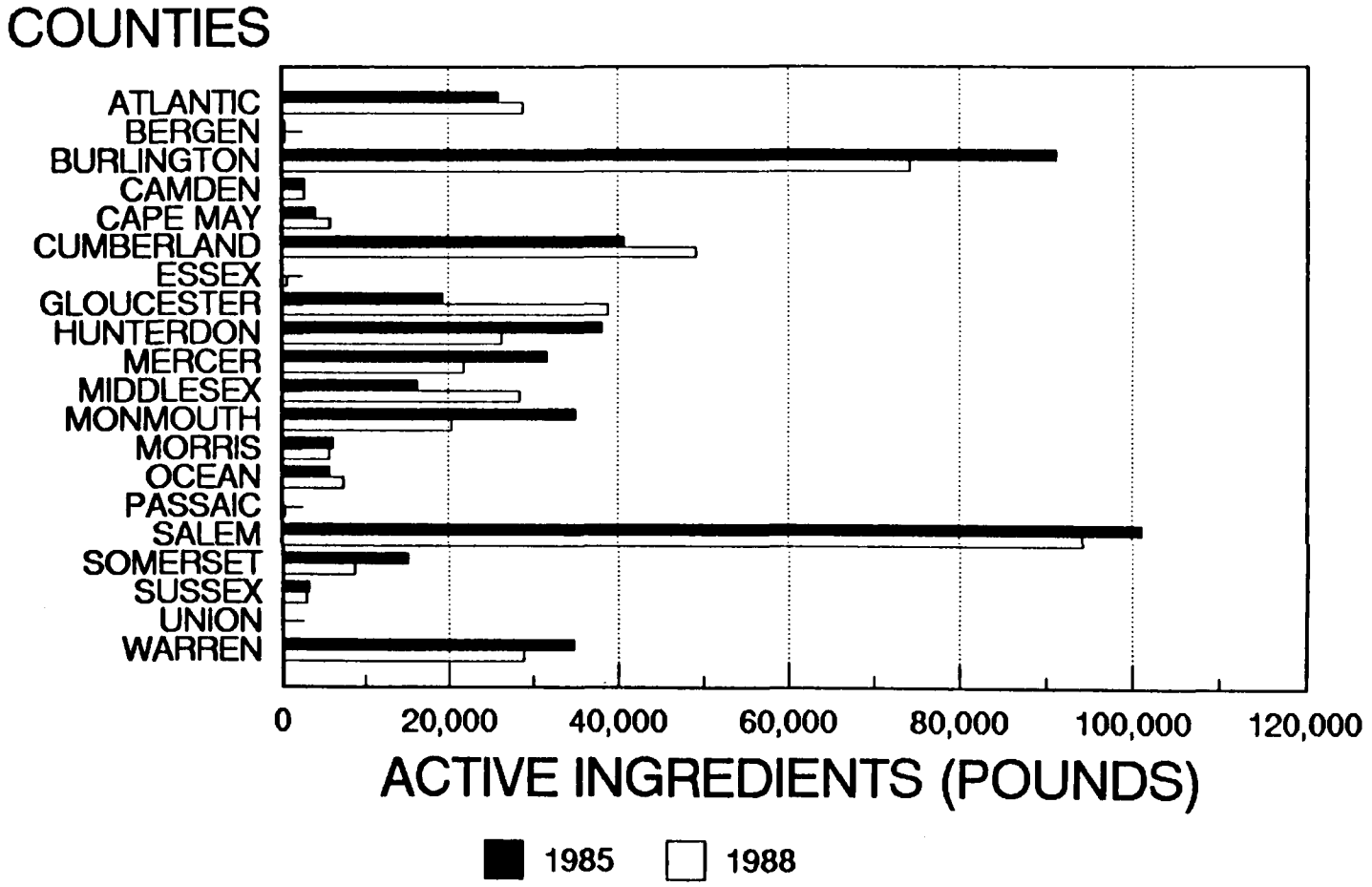
## GROWTH REGULATORS APPLIED BY COUNTY IN NEW JERSEY




Note: This Exhibit depicts the amount applied by private pesticide applicators.

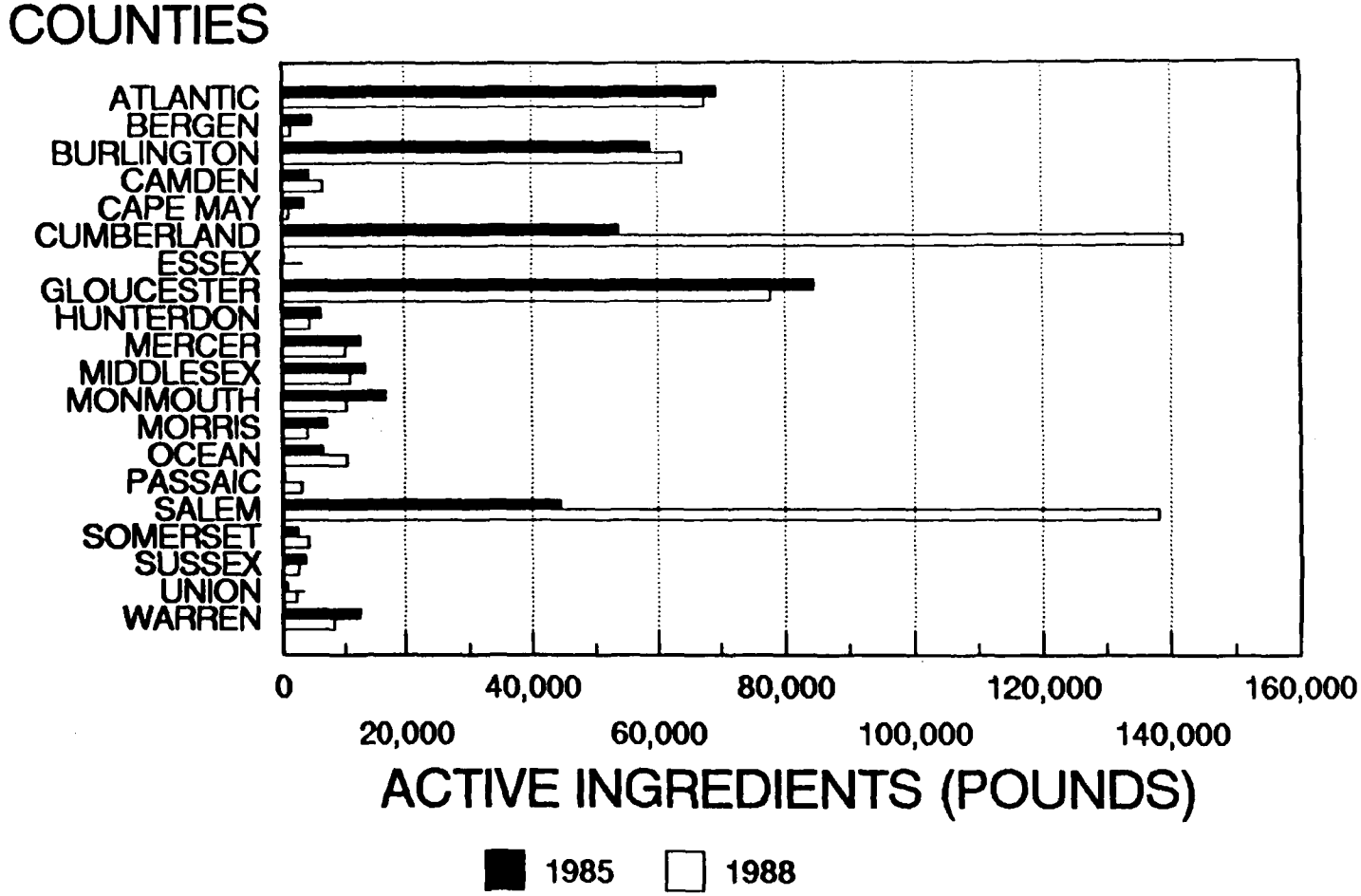
## Exhibit E-4

## HERBICIDES APPLIED BY COUNTY IN NEW JERSEY




Note: This Exhibit depicts the amount applied by private pesticide applicators.

## Exhibit E-5
## INSECTICIDES APPLIED BY COUNTY IN NEW JERSEY

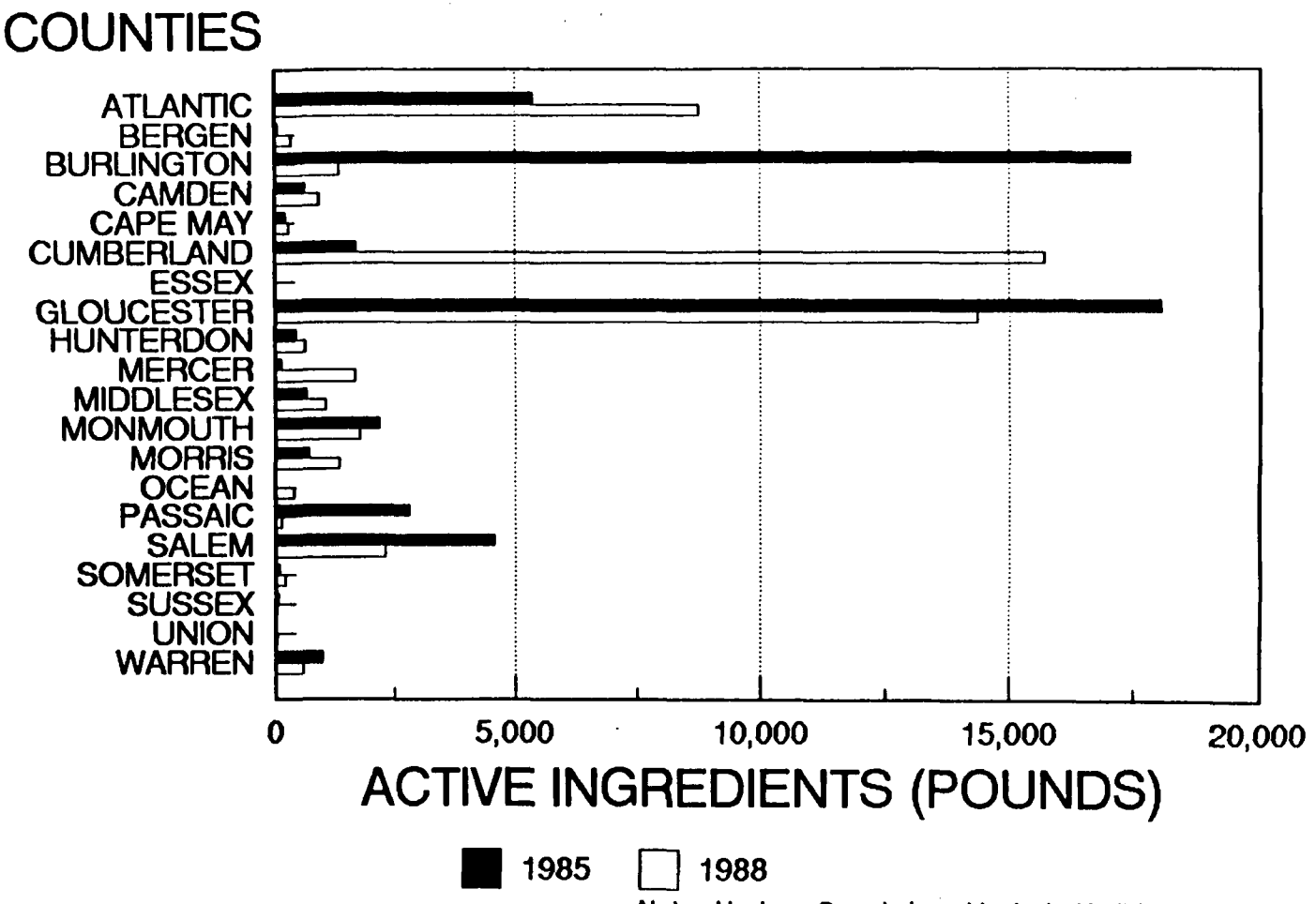



Note: This exhibit depicts the amount applied by private pesticide applicators.

Note: Hudson County is not included in this summary because of the small number of farms still active in the county.

Source: New Jersey Department of Environmental Protection, Bureau of Pesticides Operations

# Exhibit E-6
## FUMIGANTS APPLIED BY COUNTY IN NEW JERSEY

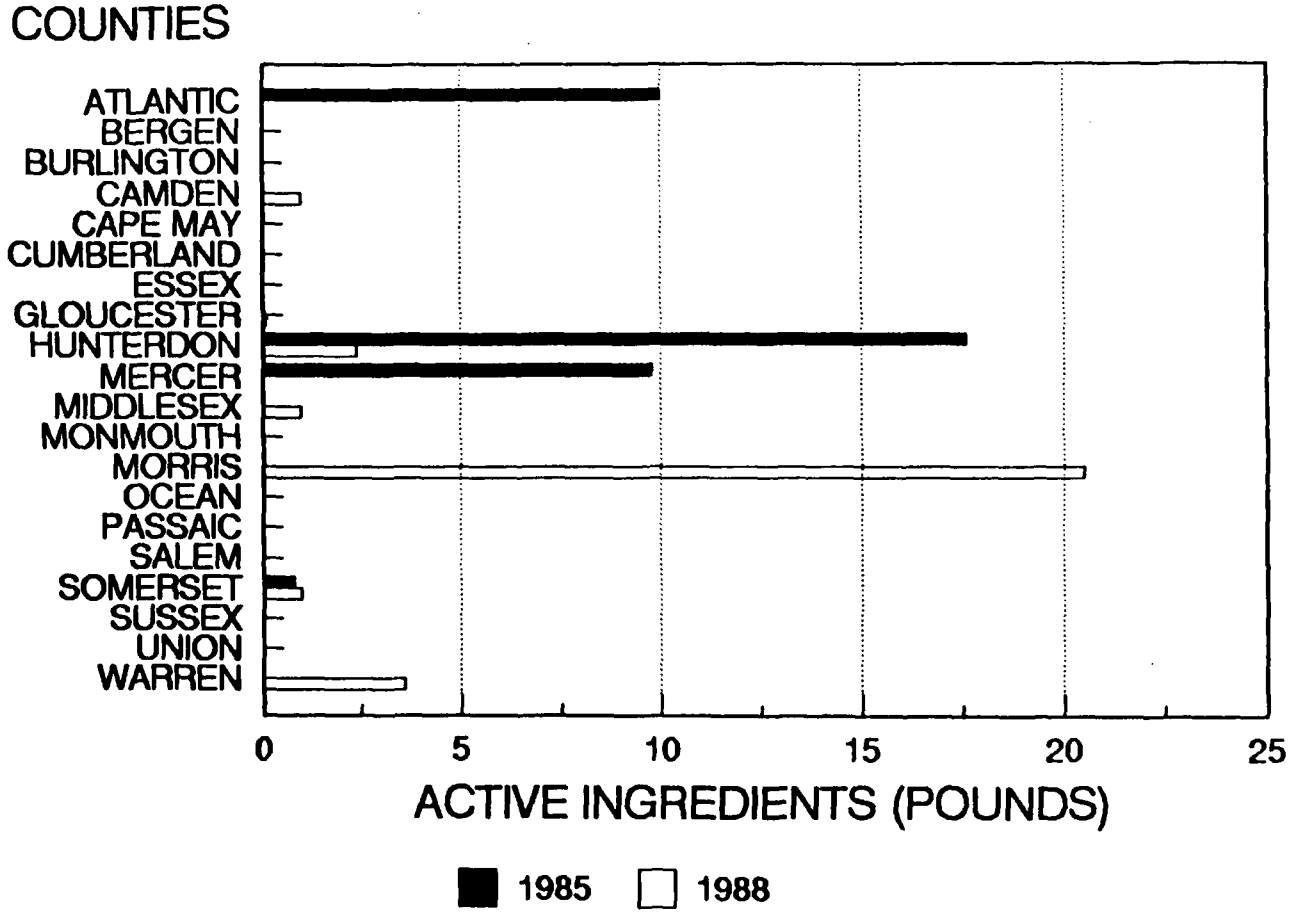



Note: This Exhibit depicts the amount applied by private pesticide applicators.

Note: Hudson County is not included in this summary because of the small number of farms still active in the county.

Source: New Jersey Department of Environmental Protection, Bureau of Pesticides Operations

# Exhibit E-7
# RODENTICIDES APPLIED BY COUNTY IN NEW JERSEY



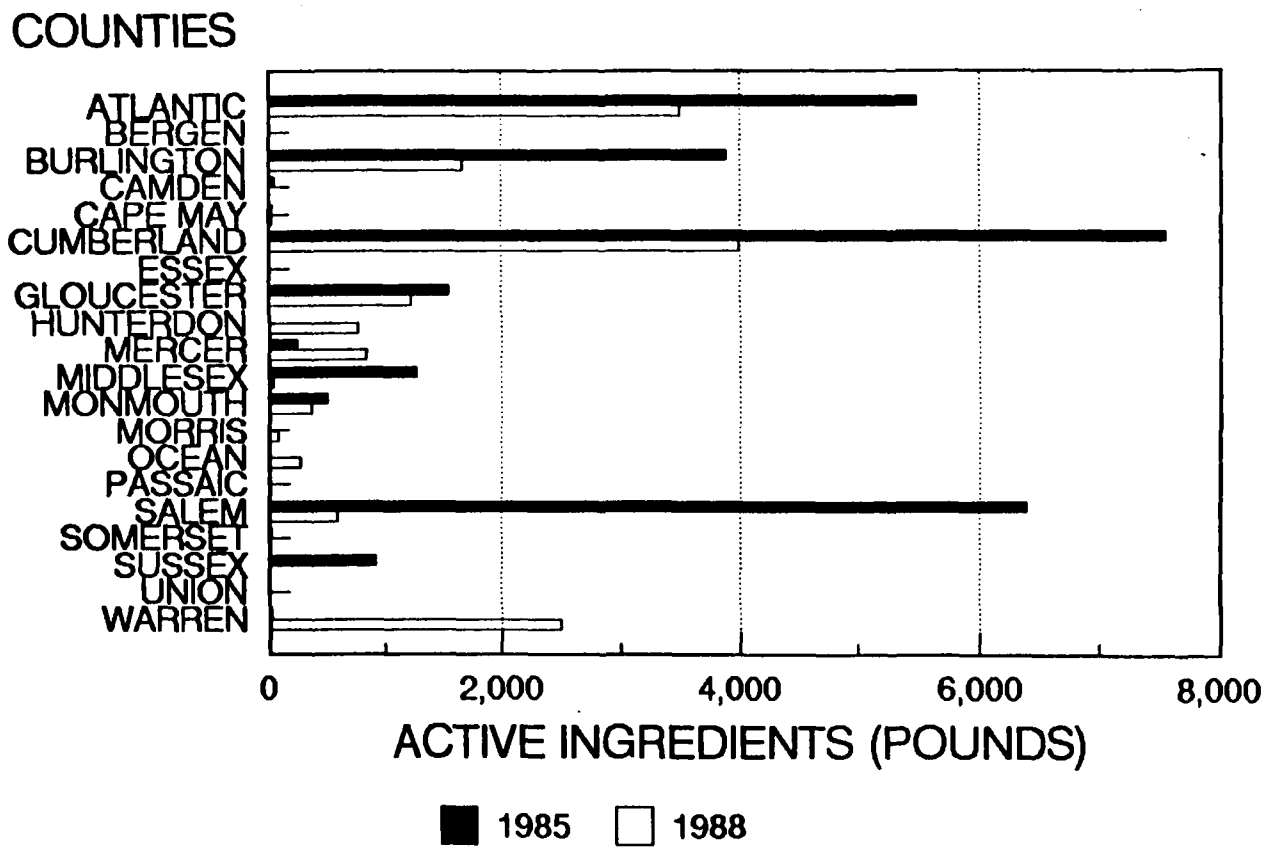

Note: This Exhibit depicts the amount applied by private pesticide applicators.

Note: Hudson County is not included in this summary because of the small number of farms still active in the county.

Source: New Jersey Department of Environmental Protection, Bureau of Pesticides Operations

Note: There were 38 registered applicators in 1985, while there were 30 in 1988.

# Exhibit E-8
# MISCELLANEOUS PESTICIDES APPLIED BY COUNTY IN NEW JERSEY

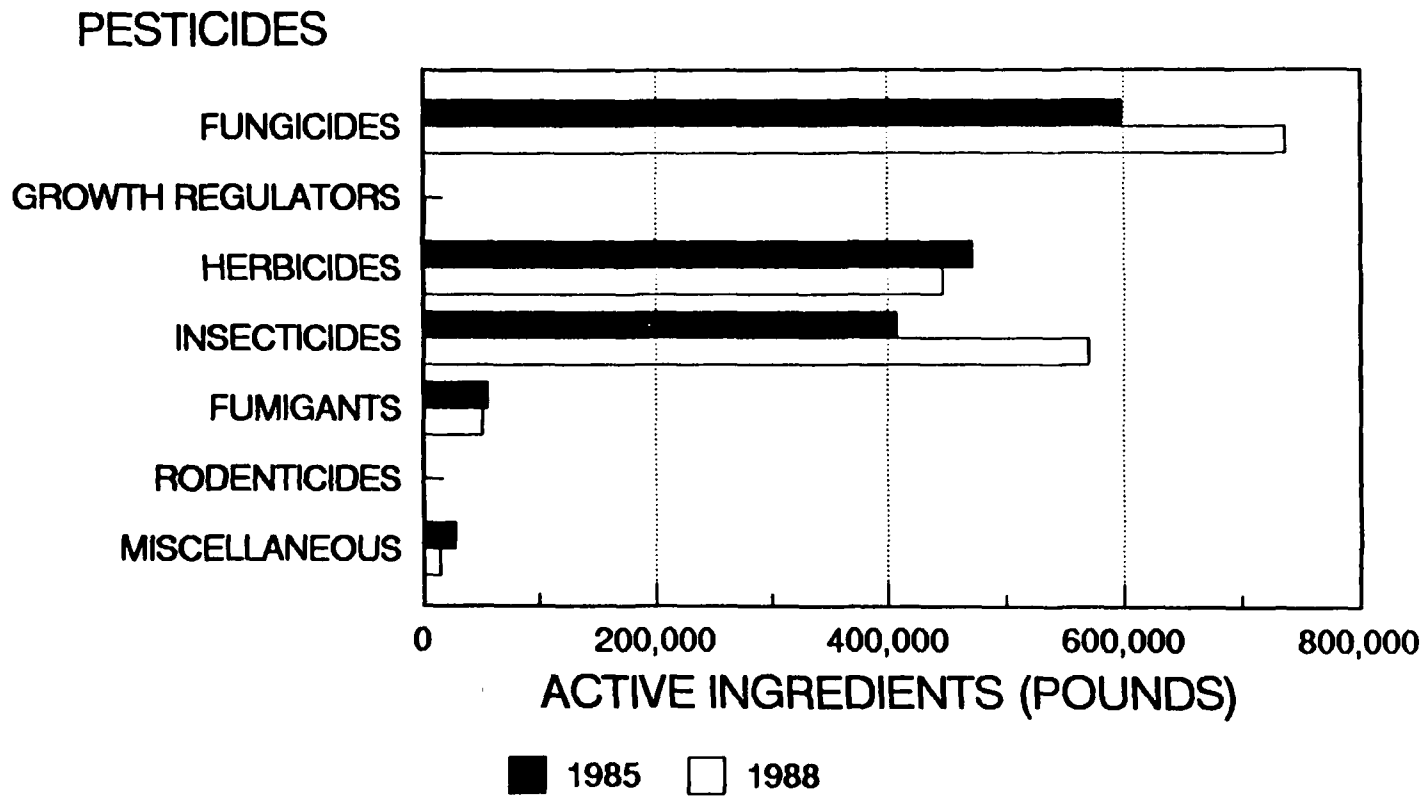



Note: This Exhibit depicts the amount applied by private pesticide applicators.

Note: Hudson County is not included in this summary because of the small number of farms still active in the county.

Source: New Jersey Department of Environmental Protection, Bureau of Pesticides Operations

# Exhibit E-9
# TOTAL POUNDS OF ACTIVE INGREDIENTS APPLIED BY PESTICIDE GROUP




Note: This Exhibit depicts the amount of active ingredients applied by private pesticide applicators.

Note: Hudson County is not included in this summary because of the small number of farms still active in the county.

Source: New Jersey Department of Environmental Protection, Bureau of Pesticides Operations

Note: There were 1795 pounds of active ingredients applied in 1985, while there 3161 pounds of active ingredients applied in 1988.

## F. ADDITIONAL INDICATORS IDENTIFIED BY NEW JERSEY PERSONNEL

This section describes additional ground-water indicators that were suggested by New Jersey personnel.

**Description of the Additional Indicators**

Information on sodium and chloride levels in raw water are tracked by the NJDEP, Bureau of Water Allocation in the "W Quality" data base. Data are reported by public water suppliers and industrial water users on a monthly or annual basis.

Secondary maximum contaminant levels (SMCLs) have been established for sodium and chloride in New Jersey. Contaminants covered by these regulations are those which may adversely affect the aesthetic quality of drinking water (e.g., taste, odor, color, and appearance), and which thereby may deter public acceptance of drinking water supplied by public water systems.[18] While secondary levels are intended as guidelines, they are not enforceable. New Jersey requires periodic monitoring for secondary contaminants in public community water systems. The regulations define upper and lower limits for these substances in drinking water to protect the public welfare. Failure of test results to fall within these limits may constitute grounds for unacceptability of the water supply.

The SMCL for chloride is 250 mg/l. Chloride concentrations above this level have an adverse effect on the taste of the water. High chloride concentrations may also contribute to the deterioration of domestic plumbing, water heaters and municipal waterworks equipment. Elevated chloride concentrations may also be associated with the presence of sodium in drinking water, which may have adverse health effects, especially on people placed on sodium-restricted diets. Chloride is a major anion that does not interact appreciably with other ions in ground water. Chloride concentrations detected in wells may indicate saltwater intrusion. A comparison of the ratio of chloride to sodium helps to verify the presence of saltwater.

The SMCL for sodium is 50 mg/l. Sodium is the principal cation in the hydrosphere and is derived geologically from the following:

- leaching of salt deposits (surface and underground), and
- decomposition of sodium aluminum silicates and similar minerals.

Other potential sources of sodium in water supplies include:

- the sodium ion as a major constituent of natural waters,
- sodium chloride as a deicing agent, and
- sodium in washing products.

This study did not investigate the relative contribution of the potential sources of sodium to ground water in New Jersey. Two USGS studies have been conducted that include determinations of sodium and chloride in water samples drawn from wells. These studies are referenced in Appendix M to this report.

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[18] "Interpreting Drinking Water Quality Analysis, What Do the Numbers Mean?" by Theodore B. Shelton, Ph.D., Rutgers Cooperative Extension

**Applicability and Relevance of the Additional Indicators in Relation to the Indicators Described in This Study**

The "W Quality" data base maintained by the Bureau of Water Allocation appears to have sufficient information to assess sodium and chloride levels in raw water. Data are reported by public water suppliers and industrial water users on a monthly or annual basis. These data are important to public water suppliers in New Jersey because of the concern for saltwater intrusion and the impact of saltwater on water supply aquifers. While New Jersey has taken steps to restrict ground-water withdrawals (Critical Areas Program) in certain areas, there is still an over dependence on ground-water supplies for drinking water in some areas. Therefore, tracking sodium and chloride levels as a measure of the impact of saltwater intrusion is important in New Jersey and should be included in the Indicators Programs as a measure of ground-water quality.

**Discussion of Nation-wide Applicability of the Additional Indicators**

Other states across the nation that are in similar geographic and hydrogeologic settings as New Jersey would benefit from tracking sodium and chloride levels as a measure of ground-water quality. Over dependence on ground water for drinking water supplies in coastal areas and areas adjacent to tidal rivers and estuaries could lead to saltwater intrusion. Other non-coastal areas with salt deposits or high salt concentrations in the geologic setting could also be vulnerable to ground-water contamination due to salt intrusion in the aquifers. These areas would also benefit from the use of these additional indicators.

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# IV. STUDY CONCLUSIONS

EPA conducted this pilot study to determine whether the criteria for reporting ground-water indicators, as developed by the EPA workgroup, could be met with data collected for the State of New Jersey. These criteria include the following:[19]

- indicators should be based on actual data measurement;
- indicators should lend themselves to graphic display to convey trends and other information readily;
- whenever possible, existing data should be used rather than requiring new data collection;
- data should be collected over time at the same locations; and
- data can have limitations and still be useful as an 'indicator' of ground-water problems or progress.

In general, the study found that data characterizing the five indicators are available and that these data do lend themselves to graphic display, as depicted in this report. EPA used only existing data for this analysis, although EPA noted that additional data collection could better characterize several of the indicators. EPA also found that much of the ground-water monitoring data compiled for this study did not fully support trend analyses because samples were not always taken from the same locations over time. Nonetheless, EPA concluded that if the limitations are understood, data are available in New Jersey to at least partially characterize each of the five ground-water indicators. The following discussion presents specific conclusions relating to the data collected for each of the indicators.

**Maximum Contaminant Levels:** Data from the FRDS-II data base are sufficient to support the national objectives for this indicator. Although EPA limited the analysis presented in this study to county-level summaries of MCL violation information, the analysis could be organized at different geographic levels and could include analyses of the populations potentially at risk from the violations. The population data maintained in FRDS, however, may not entirely reflect the actual size of the population exposed to a particular MCL violation.

**On-Site and Off-Site Contamination at Hazardous Waste Sites:** Automated data management systems maintained by New Jersey do not contain sufficient information to support all of the national objectives outlined for this indicator. EPA was able to retrieve data to assess the number of sites with ground-water contamination in seven of New Jersey's counties. For those sites, EPA was also able to determine the principal contaminants involved and the number of sites that have had their ground-water contaminant plume dimensions fully characterized. However, New Jersey maintains information characterizing the populations at risk from the contamination in paper files which were not readily available for this study.

**Volatile Organic Compounds:** EPA accessed data maintained in the USGS National Water Information System to characterize this indicator. EPA was able to organize the data available from NWIS at the county level and display trends in VOC levels graphically. EPA determined that the limited geographic distribution of the VOC analyses and the lack of consistent repeat analyses at many of the sampled wells limited the usefulness of the data to support a State analysis. A more

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[19] U.S. EPA, Office of Ground-Water Protection, April 1989. "Indicators for Measuring Progress in Ground-Water Protection." EPA 44016-88-006.

thorough and consistent VOC sampling and analysis program could better support analyses of trends in VOC levels State-wide.

**Nitrates:** EPA accessed data maintained in the USGS National Water Information System to characterize this indicator. EPA was able to organize these data at the county level and display trends in nitrate levels graphically. EPA noted several limitations with the data, however, including limited geographic coverage and inconsistent repeat sampling at well locations. Nonetheless, until the State chooses to develop a more thorough sampling program for nitrate analyses, EPA has concluded that the currently available nitrate data can support the national objectives.

**Pesticide Use:** EPA compiled pesticide usage data collected by New Jersey Bureau of Pesticide Operations in two State-wide surveys. EPA determined that these data can support the national objective of identifying the relative intensity of pesticide use on a county-by-county basis. With time and after completion of aquifer vulnerability analyses in the State, the pesticide data can also be used to support analyses of potential ground-water problems by overlaying the geographic patterns of aquifer vulnerability and pesticide use.

**Additional Indicators:** New Jersey personnel identified trends in sodium and chloride levels in ground water as an additional indicator of salt water intrusion problems. This indicator may be of special interest to coastal counties that are undergoing extensive coastal development and experiencing increasing ground-water withdrawals. Trends in sodium and chloride levels may also indicate ground-water contamination problems resulting from roadway salt applications.

The following discussion presents a summary of the general lessons learned during the course of this pilot study. The discussion first addresses the technical issues and data management practices encountered in this pilot study. The discussion then outlines suggested revisions to these existing practices that can be adopted by the State to better support future ground-water indicator reporting. Finally, the resources needed to support further indicator reporting and next steps are briefly discussed.

## A. EXISTING PRACTICES

In completing this pilot study, EPA encountered a number of problems relating to the quality and availability of the compiled data which limit their application to support the indicator objectives. The problems concerning the quality of the data related both to the representativeness or geographic coverage of the data and to the procedures used to collect the analytical results. In particular, EPA identified the following technical issues:

- data are limited in geographic coverage;
- sampling is not consistent in geographic coverage;
- sampling is not consistent over time;
- securing and analyzing samples was not uniform;
- limited repeat sampling is conducted at the same location; and
- sampling depths vary.

In addition to these technical issues, EPA also identified problems with regard to the way in which the collected data were managed. These data management issues limited EPA's ability to access and use the information provided by the State:

- data bases were originally organized to support objectives that differ from those the indicators were designed to address;

- different agencies were responsible for data presented, leading to potential inconsistencies; and

- missing annual data or other data gaps were not explicitly identified.

While these problems were encountered in the automated files, EPA also noted that many other potential data sources were either not automated or were automated in a format that could not be readily accessed by the responsible agency. In those cases, EPA was not able to access the data for this study.

## B. SUGGESTED REVISIONS TO EXISTING PRACTICES TO SUPPORT INDICATOR REPORTING

EPA is strongly promoting the wider use of indicator data collection across all Federal and State programs. An EPA Task Force, with State participation, developed concrete principles and objectives to ensure effective and consistent decision-making in all Agency decisions affecting ground water, and will also institute State Comprehensive Ground-Water Protection Programs[20]. Monitoring and data collection is one area that will be addressed.

As New Jersey continues its monitoring and data collection efforts and begins to develop its comprehensive program, it is important to keep the issues noted in the pilot study in mind. For example, sampling and analytical consistency may be promoted by establishing consistent standard scientific and data collection protocols and by promoting the development of ground-water monitoring networks, as appropriate, to provide trend data. Data management activities that employ standard data collection formats for each of the indicators are already underway in New Jersey to maintain standard data management protocols between agencies. Cooperative efforts between EPA and New Jersey will ensure that information collection activities support the objective of protecting the nation's ground-water resources.

To begin moving toward data consistency, EPA along with the States and other Federal agency work group participants developed a set of the most critical data elements for ground-water quality information. These data elements form the foundation upon which ground-water data users may build their own data base, adding elements to meet their specific needs. The use of this minimum set of data elements (MSDE)[21] will ensure that EPA and the States can share and manipulate ground-water data to support better environmental decision-making, and facilitate cross-program integration.

Once adopted, these revisions could facilitate the collection, management, and reporting of indicator data for future 305(b) reports.

## C. RESOURCES FOR IMPLEMENTING

Initially, the resources required at the State level to implement national indicator reporting may be extensive. New Jersey cannot significantly improve it data collection and reporting without expending the necessary resources to correct deficiencies. As the State establishes monitoring networks and integrates their information systems, data will become more accessible for use in indicator development. Furthermore, after the information is collected and the data elements and data

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[20] U.S. EPA, Office of the Administrator, "Protecting the Nation's Ground Water: EPA's Strategy for the 1990s," EPA 21Z-1020, (Washington, D.C.) July 1991.

[21] U.S. EPA, Office of Ground Water and Drinking Water, "Definitions for the Minimum Set of Data Elements for Ground-Water Quality," (Washington, D.C.) July 1991 (draft final).

reporting formats for including ground-water indicators in 305(b) reports are identified and applied, the effort expended for completing the 305(b) report will be greatly reduced.

## D. NEXT STEPS

This pilot study is one of three studies EPA completed to investigate the use of ground-water indicators in 305(b) reports. A Findings Report has been prepared which outlines and summarizes the information and knowledge gathered in New Jersey, Minnesota, and Idaho. The Findings Report also makes recommendations regarding the implementation of indicators in future State 305(b) reports. Based on these recommendations, EPA is developing a Technical Assistance Document (TAD)[22] to provide technical guidance to the States on how to gather and use indicator data as part of their 1992 305(b) Reports. The TAD is also intended to help set the stage for those States that are moving toward developing comprehensive ground-water monitoring and information systems, particularly in relationship to ground-water indicator reporting, and to assist those which are already in the process. The TAD is expected to be completed by early 1992.

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[22] U.S. EPA, Office of Ground-Water Protection, April 1989. "Indicators for Measuring Progress in Ground-Water Protection." EPA 44016-99-006.

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# APPENDIX A

## Bureau of Safe Drinking Water, New Jersey Public Water File (NJPWF) Sample Data Collection Forms

MODEL STATE INFORMATION SYSTEM
WATER QUALITY COMPLIANCE SUBSYSTEM

# BACTERIOLOGICAL OR TURBIDITY SUMMARY ANALYSIS INPUT

**PUBLIC WATER SYSTEM NAME AND ADDRESS**

PWS ID (1-7)

Transaction Code (8-9): 07

Contaminant ID (10-13)

CONTAMINANT NAME

Analysis Method (14-16)

NUMBER OF SAMPLES — Required (17-19) — Taken (20-22)

SAMPLE ANALYSIS RESULTS — HIGHEST (23-26) — DEC (27) — LOWEST (28-31) — DEC (32) — AVERAGE (33-36) — DEC (37)

No. of Samples in Violation — Federal MCL (38-41) — State MCL (42-45)

Longest Violation Duration (46-48)

SAMPLE PERIOD — FROM — MO DAY YR (49-54) — UNTIL — MO DAY YR (55-60)

SAMPLE TYPE (61)

Date of Last Sample — MO DAY YR (62-67)

LABORATORY ANALYZING THE MOST SAMPLES — ID — NAME (68-72)

CHECK SAMPLES — REGULATIONS REQUIRED NUMBER TAKEN — FEDERAL (73) — STATE (74) — Actual Number Taken (75-77)

Notified of Violations — Public (78) — State (79)

NUMBER OF PORTIONS POSITIVE FERMENTATION TUBE METHOD

NUMBER OF SAMPLES REQUIRING CHECK SAMPLES

PREPARED BY _____ DATE ____/____/____

APPROVED BY _____ DATE ____/____/____

| SAMPLE TYPE KEY |
|---|
| C - CHECK SAMPLE |
| D - REGULAR DISTRIBUTION SYSTEM |
| P - PLANT TAP SAMPLE |
| R - RAW WATER SAMPLE |
| S - SPECIAL SAMPLE |

## EPA Analysis Methods for Trihalomethanes

501.1. — Analysis of Trihalomethanes in Drinking Water by Purge and Trap

501.2 — Analysis of Trihalomethanes in Drinking Water by Liquid/Liquid Extraction

501.3 — Measurement of Trihalomethanes in Drinking Water by Gas Chromatography/ Mass Spectrometry and Selected Ion Monitoring

524.1 — Volatile Organic Compounds in Water by Purge and Trap Gas Chromatography/ Mass Spectrometry

524.2 — Volatile Organics Compunds in Water by Purge and Trap Capillary Column Gas Chromatography/Mass Spectrometry

OR

Equivalent as determined by EPA and certified by the NJDEP Office of Quality Assurance

## Sample Type

C — Check Sample
D — Regular Distribution System
M — Maximum Residence Time for THM's
P — Plant Tap (Treated Water) Sample
R — Raw Water Sample (Untreated)
S — Special Sample

Form DWR-042 (9/87)
DWR - BSDW - 01

New Jersey Department of Environmental Protection
Division of Water Resources - Bureau of Safe Drinking Water
CN 029, Trenton, N.J. 08625

# QUARTERLY TRIHALOMETHANE (THM) INPUT FORM

Name _____ PWS ID# __ __ __ __ __ __ __ TH

Address _____ Plant Name _____ #__ __

City _____ Laboratory ID# __ __ __ __ __

State _____ ---- Zip _____ Laboratory Name _____

| SAMPLE LOCATION | ANALYSIS RESULTS | | OTHER INFORMATION |
|---|---|---|---|
| 1. Address:_____ | Sign: (<) | ug/l (PPB) | Collection Date ..... __/__/__ |
| City:_____ County_____ | | | Analysis Date..... __/__/__ |
| 2941 - Chloroform..... | ____ | _____ | Analysis Method # _____ |
| 2942 - Bromoform..... | ____ | _____ | Sample Type: M |
| 2943 - Bromodichloromethane..... | ____ | _____ | (Max. Res. Time) |
| 2944 - Dibromochloromethane..... | ____ | _____ | |
| 2. Address:_____ | Sign: (<) | ug/l (PPB) | Collection Date ..... __/__/__ |
| City:_____ County_____ | | | Analysis Date..... __/__/__ |
| 2941 - Chloroform..... | ____ | _____ | Analysis Method #_____ |
| 2942 - Bromoform..... | ____ | _____ | Sample Type: D |
| 2943 - Bromodichloromethane..... | ____ | _____ | (Reg. Distribution) |
| 2944 - Dibromochloromethane..... | ____ | _____ | |
| 3. Address:_____ | Sign: (<) | ug/l (PPB) | Collection Date ..... __/__/__ |
| City:_____ County_____ | | | Analysis Date..... __/__/__ |
| 2941 - Chloroform..... | ____ | _____ | Analysis Method # _____ |
| 2942 - Bromoform..... | ____ | _____ | Sample Type: D |
| 2943 - Bromodichloromethane..... | ____ | _____ | (Reg. Distribution) |
| 2944 - Dibromochloromethane..... | ____ | _____ | |
| 4. Address:_____ | Sign: (<) | ug/l (PPB) | Collection Date ..... __/__/__ |
| City:_____ County_____ | | | Analysis Date..... __/__/__ |
| 2941 - Chloroform..... | ____ | _____ | Analysis Method # _____ |
| 2942 - Bromoform..... | ____ | _____ | Sample Type: D |
| 2943 - Bromodichloromethane..... | ____ | _____ | (Reg. Distribution) |
| 2944 - Dibromochloromethane..... | ____ | _____ | |

Samples were Collected by _____ __/__/__ (Date)

Form prepared by: ___Purveyor ___Laboratory

Samples were Analyzed by _____ __/__/__ (Date)

_____ __/__/__ (Signature of Representative) (Date)

NOTE: [illegible]

DWR-193 (7/88)
DWR-BSDW-06

New Jersey Department of Environmental Protection
Division of Water Resources — Bureau of Safe Drinking Water
CN 029, Trenton, N.J. 08625

# SECONDARY SUBSTANCES ANALYSIS INPUT FORM

Name_____ PWS ID# __ __ __ __ __ __ __ SC

Address_____ Plant Name_____ # __ __

City _____ Laboratory ID# __ __ __ __ __

State_____ Zip_____ Laboratory Name_____

Location at which sample collected: Collection Date ____/____/____

Address_____ Sample Type: _____

City _____ Collected by_____

County_____ Analyzed by_____

| Contaminant ID and Name | Analysis Results | | Analysis Method # | Analysis Date |
|---|---|---|---|---|
| | Sign (<) | mg/l* (PPM) | | |
| 1905 — Color | | | | |
| 1095 — Zinc | | | | |
| 1920 — Odor | | | | |
| 2905 — ABS/L.A.S. | | | | |
| 1017 — Chloride | | | | |
| 1022 — Copper | | | | |
| 1916 — Hardness (as $CaCO_3$) | | | | |
| 1028 — Iron | | | | |
| 1032 — Manganese | | | | |
| 1055 — Sulfate | | | | |
| 1930 — Total Dissolved Solids | | | | |
| 1910 — Corrosivity (LI) | | | | |
| 1925 — pH | | | | |
| 1929 — Alkalinity (as $CaCO_3$) | | | | |
| Temperature | | | | |

* *Determinations in ppm (mg/l) except Color (CU), Odor (TON), Corrosivity, pH, and Temperature (°F)*

Form prepared by: ____Owner/Operator or ____Laboratory

_____ _____ ____/____/____
Print Name Signature of Representative Date

( ) _____
Phone No.

## SAMPLE TYPE

C - Check Sample
D - Regular Distribution System Sample
M - Maximum Residence Time for THMs
P - Plant Tap (Treated Water) Sample
R - Raw Water (Untreated) Sample
S - Special Sample

-192 (6/88)
-BSDW-05

New Jersey Department of Environmental Protection
Division of Water Resources — Bureau of Safe Drinking Water
CN 029, Trenton, N.J. 08625

# INORGANIC CHEMICAL ANALYSIS INPUT FORM

ame_____ PWS ID# __ __ __ __ __ __ __ IN

ddress_____ Plant Name_____ # __ __

ity _____ Laboratory ID# __ __ __ __ __

tate_____ Zip_____ Laboratory Name_____

ocation at which sample collected: Collection Date ____/____/____

ddress_____ Sample Type: _____

City _____ Collected by_____

County_____ Analyzed by_____

| Contaminant ID and Name | Analysis Results | | Analysis Method # | Analysis Date |
|---|---|---|---|---|
| | Sign (<) | mg/l (PPM) | | |
| 1005 — Arsenic | | | | |
| 1010 — Barium | | | | |
| 1015 — Cadmium | | | | |
| 1020 — Chromium | | | | |
| 1025 — Fluoride | | | | |
| 1030 — Lead | | | | |
| 1035 — Mercury | | | | |
| 1040 — Nitrate (as N) | | | | |
| 1045 — Selenium | | | | |
| 1050 — Silver | | | | |
| 1052 — Sodium | | | | |

Form prepared by: ____Owner/Operator or ____Laboratory

_____ _____ ____/____/____
Print Name Signature of Representative Date

( )
Phone No.

## SAMPLE TYPE

C - Check Sample
D - Regular Distribution System Sample
M - Maximum Residence Time for THMs
P - Plant Tap (Treated Water) Sample
R - Raw Water (Untreated) Sample
S - Special Sample

## EPA ANALYSIS METHODS FOR INORGANICS

Indicate the Analysis Method # for the appropriate approved method as referenced in the Federal Register, 141.23 (f) 1-10
or
Equivalent as determined by USEPA and certified by the NJDEP Office of Quality Assurance.

DWR-131 (6/88)
DWR-BSDW-04

New Jersey Department of Environmental Protection
Division of Water Resources — Bureau of Safe Drinking Water
CN 029, Trenton, N.J. 08625

# ORGANIC CHEMICAL ANALYSIS INPUT FORM

Name_____ PWS ID# __ __ __ __ __ __ __ OR

Address_____ Plant Name_____ # __ __

City _____ Laboratory ID# __ __ __ __ __

State_____ Zip_____ Laboratory Name_____

Location at which sample collected: Collection Date ____/____/____

Address_____ Sample Type: _____

City _____ Collected by_____

County_____ Analyzed by_____

| Contaminant ID and Name | Analysis Results | | Analysis Method # | Analysis Date |
|---|---|---|---|---|
| | Sign (<) | ug/l (PPB) | | |
| 2005 — Endrin | | | | |
| 2010 — Lindane | | | | |
| 2015 — Methoxychlor | | | | |
| 2020 — Toxaphene | | | | |
| 2105 — 2, 4-D | | | | |
| 2110 — 2, 4, 5-TP Silvex | | | | |

Form prepared by: ____Owner/Operator or ____Laboratory

Print Name _____ Signature of Representative _____ ____/____/____ Date

( ) _____
Phone No.

## SAMPLE TYPE

C - Check Sample
D - Regular Distribution System Sample
M - Maximum Residence Time for THMs
P - Plant Tap (Treated Water) Sample
R - Raw Water (Untreated) Sample
S - Special Sample

## EPA ANALYSIS METHODS FOR ORGANICS

Indicate the Analysis Method # for the appropriate approved method as referenced in the Federal Register, 141.24 (e) & (f)

or

Equivalent as determined by USEPA and certified by the NJDEP Office of Quality Assurance.

DWR-[illegible] (12/87)
DWR-BSDW-02

New Jersey Department of Environmental Protection
Division of Water Resources — Bureau of Safe Drinking Water
CN 029, Trenton, N.J. 08625

# PERIODIC HAZARDOUS CONTAMINANT (A-280) ANALYSIS INPUT FORM

Name _____ PWS ID# __ __ __ __ __ __ __ HZ

Address _____ Plant Name _____ # __ __

City _____ Laboratory ID# __ __ __ __ __

State _____ Zip _____ Laboratory Name _____

Location at which sample collected: Collection Date ____/____/____

Address _____ Sample Type: _____

City _____ Collected by _____

County _____ Analyzed by _____

| Contaminant ID and Name | Analysis Results | | Analysis Method # | Analysis Date |
|---|---|---|---|---|
| | Sign (<) | ug/l (PPB) | | |
| 2984 — Trichloroethylene | | | | |
| 2987 — Tetrachloroethylene | | | | |
| 2982 — Carbon Tetrachloride | | | | |
| 2981 — 1,1,1 - Trichloroethane | | | | |
| 2980 — 1,2 - Dichloroethane | | | | |
| 2976 — Vinyl Chloride | | | | |
| 2964 — Methylene Chloride | | | | |
| 2990 — Benzene | | | | |
| 2989 — Chlorobenzene | | | | |
| 2401 — Total Dichlorobenzenes* | | | | |
| 2378 — 1,2,4 - Trichlorobenzene | | | | |
| 2977 — 1,1 - Dichloroethylene | | | | |
| 2380 — cis - 1,2 - Dichloroethylene | | | | |
| 2979 — trans - 1,2 - Dichloroethylene | | | | |
| 2955 — Total Xylenes* | | | | |
| 2383 — Total Polychlorinated Biphenyls* | | | | |
| 2959 — Chlordane | | | | |

** See note on the back of this form if detectable levels are found.*

Form prepared by: ____Owner/Operator or ____Laboratory

I certify that this water sample was collected and analyzed in accordance with approved procedures established by the New Jersey Department of Environmental Protection from the location described above.

Print Name _____ Signature _____ ____/____/____ Date

*NOTE: See reverse side for analysis method numbers and sample type key.*

NOTE: If detectable levels are found when analyzing for Dichlorobenzenes, Xylenes, or Polychlorinated Biphenyls, please identify the following specific isomers with their respective concentration(s) herein.

| Contaminant ID and Name | Analysis Results | | Analysis Method # | Analysis Date |
|---|---|---|---|---|
| | Sign (<) | ug/l (PPB) | | |
| 2968 — o - Dichlorobenzene | | | | |
| 2967 — m - Dichlorobenzene | | | | |
| 2969 — p - Dichlorobenzene | | | | |
| 2997 — o-Xylene | | | | |
| 2995 — m-Xylene | | | | |
| 2999 — p-Xylene | | | | |
| 2388 — Aroclor 1016 | | | | |
| 2390 — Aroclor 1221 | | | | |
| 2392 — Aroclor 1232 | | | | |
| 2394 — Aroclor 1242 | | | | |
| 2396 — Aroclor 1248 | | | | |
| 2398 — Aroclor 1254 | | | | |
| 2400 — Aroclor 1260 | | | | |

## EPA ANALYSIS METHODS FOR ORGANICS

502.1 - Volatile Halogenated Organic Chemicals in Water by Purge and Trap Gas Chromatography

502.2 - Volatile Organic Compounds in Water by Purge and Trap Capillary Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series

503.1 - Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography

504 - Measurement of 1,2-Dibromoethane (EDB) and 1,2-Dibromo-3-chloropropane (DBCP) in Drinking Water by Microextraction and Gas Chromatography

524.1 - Volatile Organic Compounds in Water by Purge and Trap Gas Chromatography/Mass Spectrometry

524.2 - Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography/ Mass Spectrometry

608 - Chlordane and Polychlorinated Biphenyls in Water by Extraction and Gas Chromatography

or

Equivalent as determined by USEPA and certified by the NJDEP Office of Quality Assurance

## SAMPLE TYPE

C - Check Sample
D - Regular Distribution System Sample
M - Maximum Residence Time for THMs
P - Plant Tap (Treated Water) Sample
R - Raw Water (Untreated) Sample
S - Special Sample

## APPENDIX B

## Summary Data of MCL Violations for Selected Counties in New Jersey

Table B-1 Number of Public Water Systems Reporting Federal MCL Violations for Barium

| County | YEAR | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
| CAMDEN | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| HUNTERDON | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 1 | 0 |
| MONMOUTH | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| MORRIS | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| OCEAN | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| PASSAIC | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| SOMERSET | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| New Jersey | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 1 | 0 |

MCL: 1.0 mg/l

Source: Federal Reporting Data System (FRDS-II)

Table B-2 Number of Public Water Systems Reporting Federal MCL Violations for Cadmium

| County | YEAR | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
| CAMDEN | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| HUNTERDON | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| MONMOUTH | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| MORRIS | 0 | 0 | 1 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| OCEAN | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| PASSAIC | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 1 | 0 |
| SOMERSET | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| New Jersey | 0 | 0 | 1 | - | 0 | 0 | 0 | 0 | 1 | 0 |

MCL: 0.01 mg/l

Source: Federal Reporting Data System (FRDS-II)

Table B-3 Number of Public Water Systems Reporting Federal MCL Violations for Nitrate

| County | YEAR | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
| CAMDEN | 0 | 0 | 0 | - | 0 | 1 | 0 | 0 | 0 | 0 |
| HUNTERDON | 0 | 0 | 0 | - | 0 | 0 | 1 | 0 | 0 | 0 |
| MONMOUTH | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| MORRIS | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| OCEAN | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| PASSAIC | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| SOMERSET | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| New Jersey | 0 | 0 | 0 | - | 0 | 1 | 1 | 0 | 0 | 0 |

MCL: 10.0 mg/l

Source: Federal Reporting Data System (FRDS-II)

Table B-4 Number of Public Water Systems Reporting Federal MCL Violations for Selenium

| County | YEAR | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
| CAMDEN | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 0 |
| HUNTERDON | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 0 |
| MONMOUTH | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 0 |
| MORRIS | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 0 |
| OCEAN | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 0 |
| PASSAIC | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 1 | 0 |
| SOMERSET | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 0 |
| New Jersey | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 1 | 0 |

MCL: 0.01 mg/l

Source: Federal Reporting Data System (FRDS-II)

Table B-5 Number of Public Water Systems Reporting Federal MCL Violations for Silver

| County | YEAR | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
| CAMDEN | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| HUNTERDON | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| MONMOUTH | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| MORRIS | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| OCEAN | 0 | 0 | 0 | - | 0 | 0 | 1 | 0 | 0 | 0 |
| PASSAIC | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| SOMERSET | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| New Jersey | 0 | 0 | 0 | - | 0 | 0 | 1 | 0 | 0 | 0 |

MCL: 0.05 mg/l

Source: Federal Reporting Data System (FRDS-II)

Table B-6 Number of Public Water Systems Reporting Federal MCL Violations for Trichloroethylene

| County | YEAR | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
| CAMDEN | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 1 |
| HUNTERDON | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 1 |
| MONMOUTH | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 0 |
| MORRIS | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 2 |
| OCEAN | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 0 |
| PASSAIC | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 0 |
| SOMERSET | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 0 |
| New Jersey | 0 | 0 | 0 | – | 0 | 0 | 0 | 0 | 0 | 4 |

MCL: 0.005 mg/l

Source: Federal Reporting Data System (FRDS-II)

Table B-7: Number of PWS Reporting Federal MCL Violations for Fecal Coliform

| County | YEAR | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
| CAMDEN | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| HUNTERDON | 0 | 0 | 0 | 0 | 4 | 1 | 8 | 4 | 4 | 24 |
| MONMOUTH | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| MORRIS | 0 | 1 | 0 | 0 | 0 | 2 | 2 | 6 | 14 | 8 |
| OCEAN | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 2 | 5 |
| PASSAIC | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 3 |
| SOMERSET | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| New Jersey | 3 | 1 | 1 | – | 7 | 3 | 11 | 13 | 23 | 47 |

MCL: N/A

Source: Federal Reporting Data System (FRDS-II)

Table B-8: Number of Public Water Systems Reporting Federal MCL Violations for Trihalomethane

| County | YEAR | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
| CAMDEN | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 1 | 0 |
| HUNTERDON | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| MONMOUTH | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| MORRIS | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| OCEAN | 0 | 0 | 0 | - | 0 | 0 | 1 | 0 | 0 | 0 |
| PASSAIC | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| SOMERSET | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| New Jersey | 0 | 0 | 0 | - | 0 | 0 | 1 | 0 | 1 | 0 |

MCL: N/A

Source: Federal Reporting Data System (FRDS-II)

Table B-9: Number of Public Water Systems Reporting Federal MCL Violations for Tetrachloroethylene

| County | YEAR | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
| CAMDEN | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 1 |
| HUNTERDON | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 1 |
| MONMOUTH | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| MORRIS | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 1 |
| OCEAN | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| PASSAIC | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| SOMERSET | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| New Jersey | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 3 |

MCL: 0.005 mg/l

Source: Federal Reporting Data System (FRDS-II)

## APPENDIX C

**Bureau of Planning and Assessment, Major Remedial Action Tracking System (MRATS) Data Forms**

Major Remedial Action Tracking System (Site File)

EPA ID _____

Site Name _____ Lead _____

Municipality _____ Case Mgr _____

County _____

CDMU ____ HRS Rank _____ NJ Rank ___

NPL _ (Y/N) Publicly Owned _ (Y/N) Federal Facility _ (Y/N) RP _ (Y/N)

ACO Signed (Y/N) _ Date _____ Fin. Assur. (Y/N) _ Amount ($M) _____

Proposed Deletion Date _____ Actual Deletion Date _____

04/12/88 MAjor Remedial Action Tracking System (Subsite File)

EPA ID _____ Site Name _____
Subsite Name _____

| Phase | Planned Start | Actual Start | Planned End | Actual End | Per Cent Comolete | Cost ($M) | Cost Code | Comment |
|---|---|---|---|---|---|---|---|---|
| RI/FS | _Q__ | _Q__ | _Q__ | _Q__ | --- | _____ | (_) F | _____ |
| | | | | | | _____ | (_) S | _____ |
| | | | | | | _____ | (_) RP | _____ |
| Design | _Q__ | _Q__ | _Q__ | _Q__ | --- | _____ | (_) F | _____ |
| | | | | | | _____ | (_) S | _____ |
| | | | | | | _____ | (_) RP | _____ |
| Construction | _Q__ | _Q__ | _Q__ | _Q__ | --- | _____ | (_) F | _____ |
| | | | | | | _____ | (_) S | _____ |
| Type _ (Comolex, Major, mOderate, mInor) | | | | | | _____ | (_) RP | _____ |
| O & M | _Q__ | _Q__ | Indefinite | | --- | _____ | (_) F | _____ |
| | | | | | | _____ | (_) S | _____ |
| Type _ (Minimal, Periodic, Full scale) | | | Years | | __ | _____ | (_) RP | _____ |

## APPENDIX D

## Bureau of Planning and Assessment, Ground-Water Pollution Investigation Data Base (GWPIDB) Data Forms

DATA SHEET FOR GROUND-WATER POLLUTION INVESTIGATION DATABASE

SITENAME:_____
LOCATION ADDRESS:_____
MAILING ADDRESS:_____
MUNICIPALITY:_____ ID NO.:_____
COUNTY:_____ SAS NUMBER:_____
LAT:_____LONG:_____ NJPDES-GW:_____
ATLAS SHEET COORD NO.:_____ NJPDES-SW:_____
DIVERSION:_____
TYPE OF SITE:_____ MAJOR SOURCE OF POLLUTION:_____

LAGOON:___ UST:___ ABOVE GROUND STORAGE TANKS:___ LANDFILL:___
SEPTIC/DRY WELL:__ SURFACE SPILL:___ AGRICULTURE:___

USGS QUAD:_____ RED ARROW:___ PRPs:_____

LEAD:_____ PROGRAM:_____ DATE OPENED BY NJDEP(mm/dd/yy):_____

DATE OF REVISION:_____ GEOLOGIST:_____ SUPPORT:_____

STATUS:_____

SOURCE REMEDIATION:_____
FREE PRODUCT RECOVERY:_____
GW PLUME DELINEATED:_____
GW PLUME CONTAINED:_____
GW RECOVERY:_____
GW TREATMENT:_____
FATE OF RECOVERED GW:_____

DIMENSIONS OF GROUND-WATER POLLUTION PLUME:

LENGTH:_____ WIDTH:_____ THICKNESS:_____
EST. VOLUME OF POLLUTED GROUND WATER:_____

LAND USE:_____ PHYSIOGRAPHIC PROVINCE:_____

SURFICIAL GEOLOGIC FORMATION:_____

AQUIFER(S) AFFECTED:_____ THREATENED:_____

PREDOMINANT GROUND-WATER FLOW DIRECTION:_____

DEPTH TO WATER:_____;TO BEDROCK:_____;TO CONFINING LAYER:_____

HYDRAULIC CONDUCTIVITY:_____ HYDRAULIC GRADIENT:_____

TOTAL NO. MONITOR WELLS:_____
PRIVATE DOMESTIC WELLS AFFECTED:_____ THREATENED:_____
COMMUNITY WELLS AFFECTED:_____ THREATENED:_____

VOs:_____ P.P. METALS:_____ BASE NEUTRALS:_____ ACID EXTRACTABLES:_____
PCB/PESTICIDES:_____ OTHER:_____

Explanation of Fields

SITENAME: official name of site (as it appears in the Computer Report).
LOCATION ADDRESS: number and street name locating the site.
MAILING ADDRESS: Full mailing address including zip code.
MUNICIPALITY: give name and identify as town, twp., boro or city.
ID NUMBER: ECRA, Spill, or other identifying #, if known. (Do not give PAC).
LATITUDE, LONGITUDE: degrees- minutes- seconds.
ATLAS SHEET COORD. NO.: seven-digit number locating case on Atlas sheet.
NJPDES-GW, SW, GW DIVERSION: permit number(s).
TYPE OF SITE: private residence, dry cleaners, factory, etc.
MAJOR SOURCE OF POLLUTION: name source which caused majority of GW problems.
LAGOON, UST, ABOVE GROUND TANKS, LANDFILL, SEPTIC/DRY WELL, SURFACE SPILL, AGRICULTURE:Yes/No/Unknown.
USGS QUAD: name of 7.5 minute quad on which site is located.
RED ARROW: A red arrow must be accurately located on pollution quads- place a check after checking.
PRPs: Have Potential Responsible Parties been identified and notified?- Yes or No.
LEAD: name of lead bureau, e.g., BCM, BFO, BSM, NBRE, DWR, BEECRA, BEAC, BGWDCM, BUST, BWS.
PROGRAM: name of program, e.g., ECRA, Superfund, A-280, Enforcement, NJPDES, UST, WSP.
DATE OPENED BY NJDEP: month/day/year.
DATE OF REVISION: date of latest comprehensive revision.
GEOLOGIST: use last name of geologist assigned to case.
SUPPORT: Geologic support group- BGWPA, BGWDC, BUST, BAP, BGWPAb.
STATUS: Choose one of the following: investigation continuing, monitoring, closed by lead agency.
SOURCE REMEDIATION: NA, none, ongoing, complete, discontinued, unknown.
FREE-PRODUCT RECOVERY: NA, none, ongoing, complete, discontinued, unknown.
GW PLUME DELINEATED?: Yes, No, partial.
GW PLUME CONTAINED?: Yes, No, partial.
GW RECOVERY: NA, none, ongoing (if ongoing, give gallons per day), complete, discontinued, unknown.
GW TREATMENT: airstripping, GAC, biological, none, etc.
FATE OF RECOVERED GW: sanitary sewer, reinjection, surface water, potable use, etc.
DIMENSIONS OF GW POLLUTION PLUME(L, W, T): in feet. If unknown, give estimate if possible.
ESTIMATED VOLUME OF GW POLLUTION: in gallons. (L*W*T*Effective Porosity*7.48gal/cu ft).
LAND USE: Choose one: residential, industrial, agricultural, woodland, comercial. Based on neighborhood surrounding the site.
PHYSIOGRAPHIC PROVINCE: Highlands, Valley and Ridge, Piedmont, Coastal Plain.
SURFICIAL GEOLOGICAL FM: give formation name .
AQUIFER(S) AFFECTED, THREATENED: aquifer name, see attached list. If more than one, separate by a comma.
PREDOM GW FLOW DIRECTION: N, NE, E, SE, S, SW, W, NW, complex (if mulitdirectional), unknown.
DEPTH TO WATER: average depth to first water, in feet, NA or unknown.
DEPTH TO BEDROCK: average depth to competent bedrock, in feet, NA or unknown.
DEPTH TO CONFINING LAYER: average depth to first confining layer, in feet, NA or unknown.
HYDRAULIC CONDUCTIVITY: avg., in ft/day. HYDRAULIC GRADIENT: avg.,in ft/ft.
TOTAL NUMBER MONITOR WELLS: total # monitor wells installed to monitor site.
PRIVATE DOMESTIC & COMMUNITY WELLS AFFECTED AND/OR THREATENED: approximate number of wells. Closed and abandoned wells count as being affected.
VOLATILE ORGANICS, PRIORITY POLLUTANT METALS, BASE NEUTRALS, ACID EXTRACTABLES, PCBS: Are they found in the ground water? Yes/No/Unknown.
OTHER: name(s) of contaminant(s) of special importance, e.g., dioxin, radionuclides.Separate compounds with semicolons
OTHER INVSTIGATIONS DIRECTLY RELATED: List SAS # of other related investigations.

Note-taking on the front of the data sheet is encouraged.

Contact "LEAD" for general questions or current status etc.:

Abbreviations-LEAD

BCM (Bureau of Case Management) @ 609-633-1455
BEAC (Bureau of ECRA Applicability and Compliance) @ 609-633-7141
BEECRA(Bur. Env. Eval. Cleanup & Rspnsblity Assmnt.) 609-633-7141
BEMQA (Bureau of Environmental Measures and Quality Assurance)
@ 609-633-0783
BFO-Metro (Bureau of Field Operations) @ 201-669-3960
BFO-Northern (Bureau of Field Operations) @ 201-299-7570
BFO-Central (Bureau of Field Operations) @ 609-426-0700
BFO-Southern (Bureau of Field Operations) @609-346-8000
BGWDC (Bureau of Ground-Water Discharge Control) @ 609-292-0424
DHWM (Division of Hazardous Waste Management-Trenton) @ 609-292-9120
BSDW (Bureau of Safe Drinking Water) @ 609-292-5550
BSM (Bureau of Site Management) @ 609-984-2990
BWS (Bureau of Water Supply) @ 609-984-5862
BUST (Bureau of Underground Storage Tanks) @ 609-984-3156
MBRE (Metro Bureau of Regional Enforcement) @ 201-669-3900
NBRE (Northern Bureau of Regional Enforcement) @ 201-299-7592
SBRE (Southern Bureau of Regional Enforcement) @ 609-426-0791
CBRE (Central Bureau of Regional Enforcement) @ 609-426-0786
BGWPAb (Bureau of Ground-Water Pollution Abatement) @ 609-292-8427
BHWE (Bureau of Hazardous Waste Engineering) @ 609-292-9880

Abbreviations-PROGRAM

ENF- Water Resources Enforcement
NJPDES- New Jersey Pollutant Discharge Elimination System
ECRA- Environmental Cleanup Responsibility Act
SF- Superfund
A-280- Safe Drinking Water Act
U- Unknown
RCRA- Resource Conservation and Recovery Act
UST- Underground Storage Tanks
BWS- Water Supply Replacement Program
BFO- Hazardous Waste Enforcement

For file review, mail written request to:

Eleanor Santarsiero, Records Custodian
NJDEP, Central File
CN-029, Trenton, New Jersey 08625

## APPENDIX E

**Bureau of Information Systems,**
**New Jersey Pollutant Discharge Elimination System (NJPDES) Data Forms**

m VWX-016
83

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
WATER QUALITY MANAGEMENT ELEMENT

# GROUND WATER ANALYSIS – VOLATILE ORGANICS REPORT

*LEASE TYPE OR PRINT WITH BALLPOINT PEN*

ACILITY NAME | SW ID NO.

AB NAME

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

THE SCHEDULE INDICATED BELOW IS TO BE OBSERVED FROM MO. YR. TO 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 | | |
| | Benzene | UG/L | 34030 | | |
| | Bromoform | UG/L | 32104 | | |
| | Carbon Tetrachloride | UG/L | 32102 | | |
| | Chlorobenzene | UG/L | 34301 | | |
| | Chlorodibromomethane | UG/L | 34306 | | |
| | Chloroform | UG/L | 32106 | | |
| | 1, 1 - Dichloroethane | UG/L | 34496 | | |
| | 1, 2 - Dichloroethane | UG/L | 34531 | | |
| | 1, 1 - Dichloroethylene | UG/L | 34501 | | |
| | 1, 2 - Dichloropropane | UG/L | 34541 | | |
| | Ethylbenzene | UG/L | 34371 | | |
| | Methylene Chloride | UG/L | 34423 | | |
| | 1, 1, 2, 2 - Tetrachloroethane | UG/L | 34516 | | |
| | Tetrachloroethylene | UG/L | 34475 | | |
| | Toluene | UG/L | 34010 | | |
| | 1, 1, 1 - Trichloroethane | UG/L | 34506 | | |
| | 1, 1, 2 - Trichloroethane | UG/L | 34511 | | |
| | Trichloroethylene | UG/L | 39180 | | |
| | Vinyl Chloride | UG/L | 39175 | | |
| | Acrolein | UG/L | 34210 | | L |
| | Chloroethane | UG/L | 34311 | | |
| | 2 - Chloroethylvinyl Ether | UG/L | 34576 | | |
| | Dichlorobromomethane | UG/L | 32105 | | |
| | 1, 3 - Dichloropropylene | UG/L | 34699 | | |
| | Methyl Bromide | UG/L | 34413 | | |
| | Methyl Chloride | UG/L | 34418 | | |
| | 1, 2 - trans - Dichloroethylene | UG/L | 34546 | | |
| | 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

Form VWX-015 A
4/83

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
WATER QUALITY MANAGEMENT ELEMENT

# GROUND WATER ANALYSIS – MONITORING WELL REPORT

*PLEASE TYPE OR PRINT WITH BALLPOINT PEN*

FACILITY NAME | SW ID NO.

LAB NAME

R | NJPDES NO. NJ (1–6) | WELL PERMIT NO. (9–16) | SAMPLE DATE YR. / MO. / DAY (17–22) | NJ LAB CERT. NO. (23–27) | WQM USE

THE SCHEDULE INDICATED BELOW IS TO BE OBSERVED FROM MO. YR. TO 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 |
|---|---|---|---|---|---|
| | Elevation of top of well casing with cap off (as specified in well completion report) | feet MSL: to nearest .01 | | | |
| | Elevation of original ground level (as specified in well completion report) | feet MSL: to nearest .01 | | | |
| | Depth to water table from top of casing prior to sampling with cap off | feet: to nearest .01 | 82546 | | |
| | Depth to water table from original ground level prior to sampling | feet: to nearest .01 | 72019 | | |
| | Arsenic, Dissolved | UG/L as As | 01000 | | |
| | Barium, Dissolved | UG/L as Ba | 01005 | | |
| | Biochemical Oxygen Demand - 5 Day | MG/L | 00310 | | |
| | Cadmium, Dissolved | UG/L as Cd | 01025 | | |
| | Chloride, Dissolved | UG/L as Cl | 82295 | | |
| | Chromium, Dissolved | UG/L as Cr | 01030 | | |
| | Chromium, Dissolved, Hexavalent | UG/L as Cr | 01220 | | |
| | Chemical Oxygen Demand (COD), Dissolved | MG/L | 00341 | | |
| | Coliform Group | N/100 ML | 74056 | | |
| | Color | Pt - Co | 00080 | | |
| | Copper, Dissolved | UG/L as Cu | 01040 | | |
| | Cyanide, Total | MG/L as CN | 00720 | | |
| | Endrin, Total | UG/L | 39390 | | |
| | Fluoride, Dissolved | MG/L as F | 00950 | | |
| | Gross Alpha, Dissolved | Pc/L | 01503 | | |
| | Gross Beta, Dissolved | Pc/L | 03503 | | |
| | Hardness, Total as $CaCO_3$ | MG/L | 00900 | | |
| | Iron, Dissolved | UG/L as Fe | 01046 | | |
| | Lead, Dissolved | UG/L as Pb | 01049 | | |
| | Lindane, Total | UG/L | 39782 | | |
| | Manganese, Dissolved | UG/L | 01056 | | |
| | Mercury, Dissolved | UG/L | 71890 | | |

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

# GROUND WATER ANALYSIS – MONITORING WELL REPORT

*ASE TYPE OR PRINT WITH BALLPOINT PEN*

CILITY NAME | SW ID NO.

B NAME

S | NJPDES NO. NJ (2–8) | WELL PERMIT NO. (9–16) | SAMPLE DATE YR. MO. DAY (17–22) | NJ LAB CERT. NO. (23–27) | WQM USE (28)

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

*SUBMIT WITH SIGNED T-VWX-014*

| SAMPLING MONTHS | ANALYSIS | UNITS | PARAMETER | VALUE | REMARKS |
|---|---|---|---|---|---|
| Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. | | | | | |
| | Methoxychlor, Total | UG/L | 39460 | | |
| | Methylene Blue Active Substances | MG/L | 38260 | | |
| | Nitrogen, Ammonia, Dissolved $NH_3 + NH_4$ as N | MG/L as N | 00608 | | |
| | Nitrogen, Nitrate Dissolved | MG/L as N | 00618 | | |
| | Odor | T.O.N. | 00085 | | |
| | pH | Standard Units | 00400 | | |
| | Phenols, Total Recoverable | UG/L | 32730 | | |
| | Radium 226, Dissolved | Pc/L | 09503 | | |
| | Radium 228, Dissolved | Pc/L | 81366 | | |
| | Selenium, Dissolved | UG/L | 01145 | | |
| | Silver, Dissolved | UG/L | 01075 | | |
| | Sodium, Dissolved | MG/L | 00930 | | |
| | Sulfate, Dissolved (as $SO_4$) | MG/L | 00946 | | |
| | Total Dissolved Solids (TDS) | PPM | 70300 | | |
| | Total Organic Carbon (TOC) | PPM | 00680 | | |
| | Total Organic Halogen (TOX) | UG/L | 70353 | | |
| | Toxaphene | UG/L | 39400 | | |
| | Turbidity | NTU | 00076 | | |
| | Zinc, Dissolved | UG/L | 01090 | | |
| | 2, 4–D, Total | UG/L | 39370 | | |
| | 2, 4, 5–TP, Total | UG/L | 39045 | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
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| | | | | | |

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

VALUE CODING RULES AND
EMARK CODES ON REVERSE

Form VWX-013
4/83

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
WATER QUALITY MANAGEMENT ELEMENT

# GROUND WATER ANALYSIS – MONITORING WELL REPORT

*PLEASE TYPE OR PRINT WITH BALLPOINT PEN*

FACILITY NAME | SW ID NO.

LAB NAME

U (1) | NJPDES NO. NJ (2–6) | WELL PERMIT NO. (9–16) | SAMPLE DATE YR. MO. DAY (17–22) | NJ LAB CERT. NO. (23–27) | WQM USE (28)

THE SCHEDULE INDICATED BELOW IS TO BE OBSERVED FROM MO. YR. TO 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 |
|---|---|---|---|---|---|
| | Aldrin/Dieldrin | UG/L | 39330 | | |
| | Benzidine | UG/L | 39120 | | |
| | Calcium (dissolved) | MG/L | 00915 | | |
| | DDT and Metabolites | UG/L | 39370 | | |
| | Nitrogen--Kjeldahl (dissolved) | MG/L as N | 00623 | | |
| | Magnesium (dissolved) | MG/L | 00925 | | |
| | Phosphorus as P | MG/L as P | 00665 | | |
| | Polychlorinated Biphenyls (Total) | UG/L | 39516 | | |
| | Specific Conductance @25 C | Umhos/cm | 00095 | | |
| | Fecal Coliform | N/100 ML | 74055 | | |
| | Fecal Streptococcus | N/100 ML | 74054 | | |
| | Total Suspended Solids | MG/L | 00530 | | |
| | Nickel (dissolved) | UG/L | 01065 | | |
| | Potassium (dissolved) | UG/L | 82038 | | |
| | Oil and Grease (Freon Extractable) | MG/L | 00556 | | |
| | Petroleum Hydrocarbons | MG/KG | 82180 | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |

VALUE CODING RULES AND
REMARK CODES ON REVERSE

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

# APPENDIX F

## Bureau of Environmental Evaluation and Risk Assessment, Geographic Information System
## Proposed Data Screens

HAZSITE INPUT SCREEN #1

DATE: automatic
NAME: ..... GIS FACILITY ID: .....
OTHER NAME FOR SITE:

ADDRESS (of site location)

STREET: .....
MUNICIPALITY: .....
COUNTY:

REGULATORY INFORMATION

LEAD AGENCY:
LEAD REGULATORY PROGRAM: ..... LEAD PROGRAM ID# FOR SITE: .....
OTHER INVOLVED PROGRAM: ..... OTHER PROGRAMS ID# FOR SITE: .....
PROGRAM PREVIOUSLY INVOLVED (with dates):

SITE DESCRIPTION #2

initial
TODAYS DATE: automatic BUREAU/DIVISION: .....

SITE SIZE (in acres): ..... LEVEL OF CONCERN: ...

IF SITE IS FEDERAL OR STATE OWNED NAME OF DEARTMENT OR AGENCY:

REDEVELOPMENT OF INDUSTRIAL USE TO: .. SPECIAL SITE TYPE DESCRIPTOR: .....

DESCRIBE PAST/CURRENT USE OF SITE:
.....
.....
.....

DESCRIBE FUTURE USE OF SITE:
.....
.....

# CONTAMINATION

Bureau/Contact: ..... Todays date: ....
Lead program ID#: ..... Site name: A-7 .....
Describe areas of concern:

.....

Evidence of offsite migration:
Info below based on sampling from ..... TO .....
Previous/other sampling collected by:

| | CLASS | COMPOUND | LOC. IN GW | LOC. IN SOIL | OTHER LOC | OFF-SITE LOC |
|---|---|---|---|---|---|---|
| CONTAMINANT 1 | ... | ..... | . | . | ..... | ..... |
| CONTAMINANT 2 | ... | ..... | . | . | ..... | ..... |
| CONTAMINANT 3 | | | | | | |

## CONTAMINATION CONTINUED

| | CLASS | COMPOUND | LOC. IN GW | LOC. IN SOIL | OTHER LOC | OFF-SITE LOC |
|---|---|---|---|---|---|---|
| CONTAMINANT 4 | ... | ..... | . | . | ..... | .... ..... |
| CONTAMINANT 5 | ... | ..... | . | . | ..... | .... .... |
| CONTAMINANT 6 | | | | | | |
| CONTAMINANT 7 | ... | ..... | . | . | ..... | ... |
| CONTAMINANT 8 | ... | ..... | . | . | ..... | . .... |

## GROUNDWATER FLOW

Bureau/Div.: .....  GIS Facility ID#: .....
Lead Program ID#: .  Site name: .....

| AQUIFER NAMES | | BETWEEN Aq#1 & Aq#2 | BETWEEN Aq#2 & Aq#3 |
|---|---|---|---|
| ..... (shallow) | Is there a confining layer | . | . |
| ..... (deep/inter.) | Thickness of confining layer | .... | .... |
| ..... (deep) | Any hydrologic connection | | |

AQUIFER CHARACTERISTICS

| | Aq#1 | Aq#2 | Aq#3 |
|---|---|---|---|
| Confined or Unconfined | . | . | |
| Bedrock or Unconsolidated | . | . | . |
| Recharge area on site | | | |
| Number of wells | ... | .. | .. |
| Depth to groundwater | .... | .... | .... |
| Date of Depth | | | |
| Direction of flow (N, NNE, etc) | ... | ... | ... |
| Date of direction | ..... | ..... | ..... |

## PHASE OF MITIGATION

TODAYS DATE: .....  BUREAU#1/CONTAC..... **********
BUREAU#2/CONTACT ******/**********/

STATUS OF:

SAMPLING.... :

CONTAMINATION: .

REMEDIATION..: .

O&M PHASE... :

GW MONITORING: .

NEIGHBORING FACILITIES

PROBABLE IMPACT FROM : ********** GIS FACILITY ID: ******
PROBABLE IMPACT TO...: ********** GIS FACILITY ID: ******

## REMEDIATION

Bureau/Contact : ..... Todays date: .....
Site name: ..... GIS facility ID#: Auto
Lead program ID#: .....
Describe remediation:
.....
.....

Month & Year Are dates projected or actual

Start remediation: .....
End remediation: .....

Which of the following describe remediation:

Containment : . On site treatment:
Fixation : . Biological: .
Chemical :
Physical : .

Disposal of location: .....

## OTHER INFO ABOUT SITE

Site name: ..... Todays Date: .....
Lead program ID#: ..... GIS Facility ID#:

Other computer sutems with info about site: .....

Date of risk assessment if performed: ....

Agency & date of any health survey: .....

Source of site location:

Where on GIS to find site map (coverage name): .....

Is above coverage name a updat; of previous info: .

## HEALTH AND ECOLOGICAL

Enter a (Y) for those that apply ---

No health impact projected(based on current land use) :
Health impact projected (based on current land use) :
No health impact projected (based on future land use):
Health impact projected (based on future land use) :
Cleanup itself represents substantial health risk :

If no health impact was projected,
was this because exposure is unlikely or limited :
If yes, explain:
.....

If health impact was projected, complete the following ---

| Exposure pathways considered-- | | Target pop. considered-- | |
|---|---|---|---|
| Soil Ingestion | : | Child | : |
| Ingestion of Ground water | : | Adult | : |
| Others(s)..... | : | Worker | : |

## HEALTH AND ECOLOGICAL

Comments: .....
.....

Are any ecological impacts projected: .
Was a formal ecological assessment done: .

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## SOIL REMEDIATION

Bureau/Contact: .....
Site Name: ... [illegible] .....
Lead program ID#: [illegible] .....

Todays date: ..
GIS facility ID#: .

| AEC | Method | Start Date | End Date | ~~Remediation~~ Residual Type | Residu Amt (YD) |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

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## WATER REMEDIATION

Bureau/Contact: .....
Site Name: ... [illegible] .....
Lead program ID#: [illegible] .....

Todays date: .....
GIS facility ID#:

| AECS(MWs) | Cont. Imp. | Method | Start Date | End Date | Residue Type | Residu Concen. (PPD) |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

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## LONG TERM GROUND WATER MONITORING

Bureau/Contact: .....  Todays date: .....
Lead program ID#: ....AUTO...
Site name: .....  GIS facility ID#: .....

| | Month & Year | Are dates projected or actual |
|---|---|---|
| Start monitoring : | ..... | |
| End monitoring : | ..... | |

Containments looking/monitoring for:

| | CLASS | COMPOUND |
|---|---|---|
| Contaminant 1 | ... | ..... |
| Contaminant 2 | ... | ..... |
| Contaminant 3 | ... | ..... |
| Contaminant 4 | ... | ..... |

Deed Restriction Y/N

## APPENDIX G

## Summary Data for Ground-Water Pollution Investigations for Selected Counties in New Jersey

Table G-1: Summary of Ground-Water Pollution Investigation Data Base

| County | No. of Ground-Water Investigations | No. of PCB Detections | No. of Metals Detections | No. of VOC Detections | No. of Investiga-* tions with Plume Dimensions |
|---|---|---|---|---|---|
| CAMDEN | 175 | 1 | 25 | 49 | 2 |
| HUNTERDON | 102 | 2 | 8 | 27 | 3 |
| MONMOUTH | 193 | 4 | 32 | 50 | 4 |
| MORRIS | 299 | 10 | 37 | 141 | 4 |
| OCEAN | 167 | 11 | 37 | 91 | 8 |
| PASSAIC | 147 | 5 | 21 | 81 | 5 |
| SOMERSET | 181 | 6 | 21 | 91 | 13 |
| New Jersey | 1264 | 39 | 181 | 530 | 39 |

Source: New Jersey Department of Environmental Protection
Bureau of Ground-Water Pollution Assessment

Note: Table reflects site data collected as of 1989

* Accurate plume dimension characterizations have been completed for few sites because of the difficulties inherent in these hydrogeological investigations.

Table G-2: Summary of Ground Water Pollution Investigation Data for Metals

| County | No. of Ground-Water Investigations | No. of Positive Detections | No. of Negative Detections | Not Tested | Unknown if Metals Were Tested |
|---|---|---|---|---|---|
| CAMDEN | 175 | 25 | 12 | 68 | 70 |
| HUNTERDON | 102 | 8 | 17 | 43 | 34 |
| MONMOUTH | 193 | 32 | 22 | 101 | 38 |
| MORRIS | 299 | 37 | 32 | 149 | 81 |
| OCEAN | 167 | 37 | 19 | 68 | 43 |
| PASSAIC | 147 | 21 | 5 | 69 | 52 |
| SOMERSET | 181 | 21 | 42 | 78 | 40 |
| New Jersey | 1264 | 181 | 149 | 576 | 358 |

Source: New Jersey Department of Environmental Protection
Bureau of Ground Water Pollution Assessment

Note: Table reflects site data collected as of 1989

Table G-3: Summary of Ground-Water Pollution Investigation Data Base for VOCs

| County | No. of Ground-Water Investigations | No. of Positive Detections | No. of Negative Detections | Not Tested | Unknown if VOCs Were Tested |
|---|---|---|---|---|---|
| CAMDEN | 175 | 49 | 11 | 54 | 61 |
| HUNTERDON | 102 | 27 | 13 | 31 | 31 |
| MONMOUTH | 193 | 50 | 14 | 101 | 28 |
| MORRIS | 299 | 141 | 14 | 87 | 57 |
| OCEAN | 167 | 91 | 10 | 43 | 23 |
| PASSAIC | 147 | 81 | 0 | 18 | 48 |
| SOMERSET | 181 | 91 | 13 | 39 | 38 |
| New Jersey | 1264 | 530 | 75 | 373 | 286 |

Source: New Jersey Department of Environmental Protection
Bureau of Ground-Water Pollution Assessment

Note: Table reflects site data collected as of 1989

Table G-4: Summary of Ground-Water Pollution Investigation Data Base for PCBs

| County | No. of Ground-Water Investigations | No. of Positive Detections | No. of Negative Detections | Not Tested | Unknown if PCBs Were Tested |
|---|---|---|---|---|---|
| CAMDEN | 175 | 1 | 13 | 91 | 70 |
| HUNTERDON | 102 | 2 | 17 | 49 | 34 |
| MONMOUTH | 193 | 4 | 16 | 135 | 38 |
| MORRIS | 299 | 10 | 22 | 186 | 81 |
| OCEAN | 167 | 11 | 35 | 78 | 43 |
| PASSAIC | 147 | 5 | 4 | 86 | 52 |
| SOMERSET | 181 | 6 | 48 | 87 | 40 |
| New Jersey | 1264 | 39 | 155 | 712 | 358 |

Source: New Jersey Department of Environmental Protection
Bureau of Ground-Water Pollution Assessment

Note: Table reflects site data collected as of 1989

## APPENDIX H

## Summary of Volatile Organic Compound Detections for Selected Counties in New Jersey

Table H-1.1: Summary of VOC Detections for Camden County, New Jersey

| | | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 66 | 73 | 9 | 2 | 17 | 17 | 1 | 0 | 41 | 41 | 1 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (1) | CARBON TETRACHLORIDE | 66 | 73 | 0 | 0 | 16 | 16 | 0 | 0 | 41 | 41 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | CHLOROBENZENE | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 41 | 41 | 2 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | CHLOROETHANE | 0 | 0 | 0 | NT | 3 | 3 | 0 | NT | 41 | 41 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | DICHLOROBROMETHANE | 66 | 73 | 0 | NT | 16 | 16 | 0 | NT | 41 | 41 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 0 | 0 | 0 | NT | 3 | 3 | 0 | NT | 41 | 41 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | ETHYLBENZENE | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 41 | 41 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | METHYLBROMIDE | 0 | 0 | 0 | NT | 3 | 3 | 0 | NT | 41 | 41 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | METHYLCHLORIDE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | METHYLENE CHLORIDE | 66 | 73 | 1 | 0 | 16 | 16 | 0 | 0 | 41 | 41 | 2 | 2 | - | - | - | - | 0 | 0 | 0 | 0 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 66 | 73 | 8 | NT | 16 | 16 | 2 | NT | 41 | 41 | 5 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | TOLUENE | 66 | 73 | 3 | 0 | 17 | 17 | 1 | 0 | 41 | 41 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| | TOTALS | | 438 | 21 | 2 | | 114 | 4 | 0 | | 451 | 10 | 2 | | - | - | - | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

"-" Signifies that Data are Missing for that Year

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-1.2: Sumarry of VOC Detections for Camden County, New Jersey

| | | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 66 | 73 | 16 | 16 | 16 | 16 | 7 | 4 | 41 | 41 | 10 | 10 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | TRICHLOROFLUOROMETHANE | 0 | 0 | 0 | NT | 3 | 3 | 0 | NT | 41 | 41 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | VINYLCHLORIDE | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 41 | 41 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 66 | 73 | 10 | NT | 16 | 16 | 0 | NT | 41 | 41 | 2 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | 1,1-DICHLOROETHYLENE | 0 | 0 | 0 | NT | 3 | 3 | 0 | NT | 41 | 41 | 2 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 66 | 73 | 2 | 0 | 16 | 16 | 0 | 0 | 41 | 41 | 2 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 41 | 41 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 41 | 41 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (1) | 1,2-DICHLOROETHANE | 66 | 73 | 1 | 0 | 16 | 16 | 2 | 2 | 41 | 41 | 6 | 6 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 41 | 41 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 66 | 73 | 3 | 0 | 16 | 16 | 3 | 1 | 41 | 41 | 7 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,3-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 3 | 3 | 0 | NT | 41 | 41 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 0 | 0 | 0 | NT | 3 | 3 | 0 | NT | 41 | 41 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| | TOTALS | | 365 | 32 | 16 | | 104 | 12 | 7 | | 545 | 29 | 16 | | - | - | - | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-1.3: Summary of VOC Detections for Camden County, New Jersey

| | | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 11 | 11 | 2 | 1 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 1 | 0 | 0 | 0 | 0 | 0 |
| (1) | CARBONTETRACHLORIDE | 11 | 11 | 0 | 0 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | CHLOROBENZENE | 11 | 11 | 2 | 0 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | CHLOROETHANE | 11 | 11 | 0 | NT | - | - | - | NT | 1 | 5 | 0 | NT | 7 | 7 | 0 | NT | 0 | 0 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 5 | 0 | NT | 7 | 7 | 0 | NT | 0 | 0 | 0 | NT |
| NT | DICHLOROBROMETHANE | 11 | 11 | 0 | NT | - | - | - | NT | 1 | 5 | 0 | NT | 7 | 7 | 0 | NT | 0 | 0 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 11 | 11 | 0 | NT | - | - | - | NT | 1 | 5 | 0 | NT | 7 | 7 | 1 | NT | 0 | 0 | 0 | NT |
| (2) | ETHYLBENZENE | 11 | 11 | 0 | 0 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | METHYLBROMIDE | 11 | 11 | 0 | NT | - | - | - | NT | 1 | 5 | 0 | NT | 7 | 7 | 0 | NT | 0 | 0 | 0 | NT |
| NT | METHYLCHLORIDE | 2 | 2 | 0 | NT | - | - | - | NT | 1 | 5 | 0 | NT | 7 | 7 | 0 | NT | 0 | 0 | 0 | NT |
| NT | METHYLENECHLORIDE | 11 | 11 | 1 | 1 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 11 | 11 | 4 | NT | - | - | - | NT | 1 | 5 | 4 | NT | 7 | 7 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | TOLUENE | 11 | 11 | 0 | 0 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTALS | | 123 | 9 | 2 | | 0 | 0 | 0 | | 70 | 4 | 0 | | 98 | 2 | 0 | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-1.4: Summary of VOC Detections for Camden County, New Jersey

| | | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 5 | 0 | NT | 7 | 7 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 11 | 11 | 7 | 6 | - | - | - | - | 1 | 5 | 4 | 4 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | TRICHLOROFLUOROMETHANE | 11 | 11 | 1 | NT | - | - | - | NT | 1 | 5 | 0 | NT | 7 | 7 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | VINYLCHLORIDE | 11 | 11 | 2 | 2 | - | - | - | - | 1 | 5 | 3 | 3 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 11 | 11 | 2 | NT | - | - | - | NT | 1 | 5 | 4 | NT | 7 | 7 | 1 | NT | 0 | 0 | 0 | NT |
| NT | 1,1-DICHLOROETHYLENE | 11 | 11 | 0 | NT | - | - | - | NT | 1 | 5 | 4 | NT | 7 | 7 | 1 | NT | 0 | 0 | 0 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 11 | 11 | 2 | 0 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 1 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 11 | 11 | 0 | 0 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 11 | 11 | 0 | 0 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 5 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | 1,2-DICHLOROETHANE | 11 | 11 | 2 | 1 | - | - | - | - | 1 | 5 | 2 | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 11 | 11 | 1 | 1 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 1 | 0 | 0 | 0 | 0 | 0 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 11 | 11 | 4 | 0 | - | - | - | - | 1 | 5 | 4 | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,3-DICHLOROBENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 5 | 0 | 0 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 11 | 11 | 0 | NT | - | - | - | NT | 1 | 5 | 0 | NT | 7 | 7 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 11 | 11 | 0 | NT | - | - | - | NT | 1 | 5 | 0 | NT | 7 | 7 | 0 | NT | 0 | 0 | 0 | NT |
| | TOTALS | | 143 | 21 | 10 | | 0 | 0 | 0 | | 90 | 21 | 7 | | 119 | 4 | 0 | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-2.1: Summary of VOC Detections for Hunterdon County, New Jersey

| | | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (1) | CARBON TETRACHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | CHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | CHLOROETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | DICHLOROBROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | ETHYLBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | METHYLBROMIDE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | METHYLCHLORIDE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | METHYLENE CHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | TOLUENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| | TOTALS | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | - | - | - | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-2.2: Summary of VOC Detections for Hunterdon County, New Jersey

| | | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | TRICHLOROFLUOROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | VINYLCHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | 1,1-DICHLOROETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (1) | 1,2-DICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,3-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| | TOTALS | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | - | - | - | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-2.3: Summary of VOC Detections for Hunterdon County, New Jersey

| | | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | CARBON TETRACHLORIDE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | CHLOROBENZENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | CHLOROETHANE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 16 | 18 | 0 | NT | 0 | 0 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 16 | 18 | 0 | NT | 0 | 0 | 0 | NT |
| NT | DICHLOROBROMETHANE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 16 | 18 | 0 | NT | 0 | 0 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 16 | 18 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | ETHYLBENZENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | METHYLBROMIDE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 16 | 18 | 0 | NT | 0 | 0 | 0 | NT |
| NT | METHYLCHLORIDE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 16 | 18 | 0 | NT | 0 | 0 | 0 | NT |
| NT | METHYLENE CHLORIDE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 16 | 18 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | TOLUENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTALS | | 0 | 0 | 0 | | – | – | – | | 0 | 0 | 0 | | 252 | 0 | 0 | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-2.4: Summary of VOC Detections for Hunterdon County, New Jersey

| | | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 16 | 18 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | TRICHLOROFLUOROMETHANE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 16 | 18 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | VINYLCHLORIDE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 16 | 18 | 0 | NT | 0 | 0 | 0 | NT |
| NT | 1,1-DICHLOROETHYLENE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 16 | 18 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 16 | 18 | 1 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 13 | 14 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | 1,2-DICHLOROETHANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,3-DICHLOROBENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 16 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 16 | 18 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 16 | 18 | 0 | NT | 0 | 0 | 0 | NT |
| | TOTALS | | 0 | 0 | 0 | | - | - | - | | 0 | 0 | 0 | | 248 | 1 | 0 | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-3.1: Summary of VOC Detections for Monmouth County, New Jersey

| | | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (1) | CARBON TETRACHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (2) | CHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| NT | CHLOROETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| NT | DICHLOROBROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| (2) | ETHYLBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| NT | METHYL BROMIDE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| NT | METHYLCHLORIDE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| NT | METHYLENE CHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| (2) | TOLUENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| | TOTALS | | 0 | 0 | 0 | | 0 | 0 | 0 | | 27 | 0 | 0 | | – | – | – | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

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(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-3.2: Summary of VOC Detections for Monmouth County, New Jersey

| | | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | TRICHLOROFLUOROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | VINYLCHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | 1,1-DICHLOROETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (1) | 1,2-DICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,3-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| | TOTALS | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | - | - | - | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-3.3: Summary of VOC Detections for Monmouth County, New Jersey

| | | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | CARBON TETRACHLORIDE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | CHLOROBENZENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | CHLOROETHANE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| NT | DICHLOROBROMETHANE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | ETHYLBENZENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | METHYLBROMIDE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| NT | METHYLCHLORIDE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| NT | METHYLENE CHLORIDE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | TOLUENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTALS | | 0 | 0 | 0 | | – | – | – | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-3.4: Summary of VOC Detections for Monmouth County, New Jersey

| | VOLATILE ORGANIC CHEMICALS | 1985 No. Well (A) | 1985 No. Sam Takn Anlz (B) | 1985 No. Sam Dets (C) | 1985 No. Dets Exc MCL (D) | 1986 No. Well (A) | 1986 No. Sam Takn Anlz (B) | 1986 No. Sam Dets (C) | 1986 No. Dets Exc MCL (D) | 1987 No. Well (A) | 1987 No. Sam Takn Anlz (B) | 1987 No. Sam Dets (C) | 1987 No. Dets Exc MCL (D) | 1988 No. Well (A) | 1988 No. Sam Takn Anlz (B) | 1988 No. Sam Dets (C) | 1988 No. Dets Exc MCL (D) | 1989 No. Well (A) | 1989 No. Sam Takn Anlz (B) | 1989 No. Sam Dets (C) | 1989 No. Dets Exc MCL (D) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | TRICHLOROFLUOROMETHANE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | VINYLCHLORIDE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| NT | 1,1-DICHLOROETHYLENE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | 1,2-DICHLOROETHANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,3-DICHLOROBENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| | TOTALS | | 0 | 0 | 0 | | - | - | - | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-4.1: Summary of VOC Detections for Morris County, New Jersey

| | | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (1) | CARBON TETRACHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | CHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | CHLOROETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | DICHLOROBROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | ETHYLBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | METHYLBROMIDE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | METHYLCHLORIDE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | METHYLENE CHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | TOLUENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| | TOTALS | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | - | - | - | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

"-" Signifies that Data are Missing for that Year

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-4.2: Summary of VOC Detections for Morris County, New Jersey

| | VOLATILE ORGANIC CHEMICALS | 1980 No. Well (A) | 1980 No. Sam Takn Anlz (B) | 1980 No. Sam Dets (C) | 1980 No. Dets Exc MCL (D) | 1981 No. Well (A) | 1981 No. Sam Takn Anlz (B) | 1981 No. Sam Dets (C) | 1981 No. Dets Exc MCL (D) | 1982 No. Well (A) | 1982 No. Sam Takn Anlz (B) | 1982 No. Sam Dets (C) | 1982 No. Dets Exc MCL (D) | 1983 No. Well (A) | 1983 No. Sam Takn Anlz (B) | 1983 No. Sam Dets (C) | 1983 No. Dets Exc MCL (D) | 1984 No. Well (A) | 1984 No. Sam Takn Anlz (B) | 1984 No. Sam Dets (C) | 1984 No. Dets Exc MCL (D) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| NT | TRICHLOROFLUOROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| (1) | VINYLCHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| NT | 1,1-DICHLOROETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (1) | 1,2-DICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (2) | 1,3-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| | TOTALS | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | – | – | – | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
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"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-4.3: Summary of VOC Detections for Morris County, New Jersey

| | | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 16 | 16 | 0 | 0 | – | – | – | – | 16 | 19 | 2 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 1 | 0 |
| (1) | CARBON TETRACHLORIDE | 16 | 16 | 0 | 0 | – | – | – | – | 16 | 19 | 1 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 0 | 0 |
| (2) | CHLOROBENZENE | 16 | 16 | 0 | 0 | – | – | – | – | 16 | 19 | 0 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 0 | 0 |
| NT | CHLOROETHANE | 16 | 16 | 0 | NT | – | – | – | NT | 16 | 19 | 0 | NT | 4 | 4 | 0 | NT | 10 | 10 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | – | – | – | NT | 16 | 19 | 0 | NT | 4 | 4 | 0 | NT | 10 | 10 | 0 | NT |
| NT | DICHLOROBROMETHANE | 16 | 16 | 0 | NT | – | – | – | NT | 16 | 19 | 3 | NT | 4 | 4 | 0 | NT | 10 | 10 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 16 | 16 | 0 | NT | – | – | – | NT | 16 | 19 | 1 | NT | 4 | 4 | 0 | NT | 10 | 10 | 0 | NT |
| (2) | ETHYLBENZENE | 16 | 16 | 0 | 0 | – | – | – | – | 16 | 19 | 0 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 0 | 0 |
| NT | METHYLBROMIDE | 16 | 16 | 0 | NT | – | – | – | NT | 16 | 19 | 0 | NT | 4 | 4 | 0 | NT | 10 | 10 | 0 | NT |
| NT | METHYLCHLORIDE | 9 | 9 | 0 | NT | – | – | – | NT | 16 | 19 | 0 | NT | 4 | 4 | 0 | NT | 10 | 10 | 0 | NT |
| NT | METHYLENE CHLORIDE | 16 | 16 | 0 | 0 | – | – | – | – | 16 | 19 | 0 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 0 | 0 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | – | – | – | – | 16 | 19 | 0 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 16 | 16 | 4 | NT | – | – | – | NT | 16 | 19 | 4 | NT | 4 | 4 | 0 | NT | 10 | 10 | 4 | NT |
| (2) | TOLUENE | 16 | 16 | 0 | 0 | – | – | – | – | 16 | 19 | 3 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 0 | 0 |
| | TOTALS | | 185 | 4 | 0 | | – | – | – | | 266 | 14 | 0 | | 56 | 0 | 0 | | 140 | 5 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

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(2) Health Based Threshold is Based on Proposed Federal MCL
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NT No Health Based Threshold Available

"–" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-4.4: Summary of VOC Detections for Morris County, New Jersey

| | | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | - | - | - | NT | 16 | 19 | 0 | NT | 4 | 4 | 0 | NT | 10 | 10 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 16 | 16 | 12 | 10 | - | - | - | - | 16 | 19 | 10 | 5 | 4 | 4 | 0 | 0 | 10 | 10 | 6 | 4 |
| NT | TRICHLOROFLUOROMETHANE | 16 | 16 | 0 | NT | - | - | - | NT | 16 | 19 | 4 | NT | 4 | 4 | 0 | NT | 10 | 10 | 0 | NT |
| (1) | VINYLCHLORIDE | 16 | 16 | 3 | 3 | - | - | - | - | 16 | 19 | 0 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 3 | 1 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | - | - | - | - | 16 | 19 | 1 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 16 | 16 | 1 | NT | - | - | - | NT | 16 | 19 | 4 | NT | 4 | 4 | 0 | NT | 10 | 10 | 3 | NT |
| NT | 1,1-DICHLOROETHYLENE | 16 | 16 | 2 | NT | - | - | - | NT | 16 | 19 | 3 | NT | 4 | 4 | 0 | NT | 10 | 10 | 5 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 16 | 16 | 4 | 0 | - | - | - | - | 16 | 19 | 9 | 0 | 4 | 4 | 2 | 0 | 10 | 10 | 2 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 16 | 16 | 1 | 1 | - | - | - | - | 16 | 19 | 0 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 0 | 0 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 16 | 16 | 0 | 0 | - | - | - | - | 16 | 19 | 0 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 0 | 0 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | - | - | - | NT | 16 | 19 | 0 | NT | 2 | 2 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 9 | 9 | 0 | 0 | - | - | - | - | 16 | 19 | 0 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 0 | 0 |
| (1) | 1,2-DICHLOROETHANE | 16 | 16 | 0 | 0 | - | - | - | - | 16 | 19 | 0 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 1 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 16 | 16 | 0 | 0 | - | - | - | - | 16 | 19 | 0 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 0 | 0 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 16 | 16 | 6 | 0 | - | - | - | - | 16 | 19 | 3 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 6 | 1 |
| (2) | 1,3-DICHLOROBENZENE | 5 | 5 | 0 | 0 | - | - | - | - | 16 | 19 | 0 | 0 | 4 | 4 | 0 | 0 | 10 | 10 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 16 | 16 | 0 | NT | - | - | - | NT | 16 | 19 | 0 | NT | 4 | 4 | 0 | NT | 10 | 10 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 16 | 16 | 0 | NT | - | - | - | NT | 16 | 19 | 0 | NT | 4 | 4 | 0 | NT | 10 | 10 | 0 | NT |
| | TOTALS | | 174 | 14 | 1 | | - | - | - | | 266 | 20 | 0 | | 54 | 2 | 0 | | 130 | 17 | 1 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-5.1: Summary of VOC Detections for Ocean County, New Jersey

| | | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam. Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 0 | 0 | 0 | 0 | 28 | 28 | 1 | 1 | 153 | 153 | 3 | 0 | - | - | - | - | 16 | 16 | 0 | 0 |
| (1) | CARBON TETRACHLORIDE | 0 | 0 | 0 | 0 | 10 | 10 | 0 | 0 | 1 | 1 | 0 | 0 | - | - | - | - | 16 | 16 | 0 | 0 |
| (2) | CHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | - | - | - | - | 16 | 16 | 0 | 0 |
| NT | CHLOROETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 1 | 1 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | DICHLOROBROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 1 | 1 | 0 | NT | - | - | - | NT | 16 | 16 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 1 | 1 | 0 | NT | - | - | - | NT | 16 | 16 | 0 | NT |
| (2) | ETHYLBENZENE | 0 | 0 | 0 | 0 | 18 | 18 | 0 | 0 | 153 | 153 | 0 | 0 | - | - | - | - | 16 | 16 | 0 | 0 |
| NT | METHYLBROMIDE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 1 | 1 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | METHYLCHLORIDE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | METHYLENE CHLORIDE | 0 | 0 | 0 | 0 | 10 | 10 | 0 | 0 | 1 | 1 | 0 | 0 | - | - | - | - | 16 | 16 | 0 | 0 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 0 | 0 | 0 | NT | 10 | 10 | 0 | NT | 1 | 1 | 0 | NT | - | - | - | NT | 16 | 16 | 1 | NT |
| (2) | TOLUENE | 0 | 0 | 0 | 0 | 27 | 27 | 0 | 0 | 153 | 153 | 1 | 0 | - | - | - | - | 16 | 16 | 0 | 0 |
| | TOTALS | | 0 | 0 | 0 | | 103 | 1 | 1 | | 467 | 4 | 0 | | - | - | - | | 144 | 1 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-5.2: Summary of VOC Detections for Ocean County, New Jersey

| | VOLATILE ORGANIC CHEMICALS | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam. Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 0 | 0 | 0 | 0 | 10 | 10 | 0 | 0 | 1 | 1 | 0 | 0 | – | – | – | – | 16 | 16 | 0 | 0 |
| NT | TRICHLOROFLUOROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 1 | 1 | 0 | NT | – | – | – | NT | 16 | 16 | 0 | NT |
| (1) | VINYLCHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 1 | 1 | 0 | NT | – | – | – | NT | 16 | 16 | 0 | NT |
| NT | 1,1-DICHLOROETHYLENE | 0 | 0 | 0 | NT | 10 | 10 | 0 | NT | 1 | 1 | 0 | NT | – | – | – | NT | 16 | 16 | 0 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 0 | 0 | 0 | 0 | 10 | 10 | 0 | 0 | 1 | 1 | 0 | 0 | – | – | – | – | 16 | 16 | 0 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | – | – | – | – | 16 | 16 | 0 | 0 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | – | – | – | – | 16 | 16 | 0 | 0 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (1) | 1,2-DICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | – | – | – | – | 16 | 16 | 0 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | – | – | – | – | 16 | 16 | 0 | 0 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 0 | 0 | 0 | 0 | 10 | 10 | 0 | 0 | 1 | 1 | 0 | 0 | – | – | – | – | 16 | 16 | 0 | 0 |
| (2) | 1,3-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 1 | 1 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 1 | 1 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| | TOTALS | | 0 | 0 | 0 | | 40 | 0 | 0 | | 13 | 0 | 0 | | – | – | – | | 160 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-5.3: Summary of VOC Detections for Ocean County, New Jersey

| | | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 4 | 4 |
| (1) | CARBON TETRACHLORIDE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 0 | 0 |
| (2) | CHLOROBENZENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 6 | 3 |
| NT | CHLOROETHANE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 5 | 23 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 5 | 23 | 0 | NT |
| NT | DICHLOROBROMETHANE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 5 | 23 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 5 | 23 | 0 | NT |
| (2) | ETHYLBENZENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 0 | 0 |
| NT | METHYLBROMIDE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 5 | 23 | 0 | NT |
| NT | METHYLCHLORIDE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 5 | 23 | 0 | NT |
| NT | METHYLENE CHLORIDE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 1 | 1 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 5 | 23 | 1 | NT |
| (2) | TOLUENE | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 1 | 0 |
| | TOTALS | | 0 | 0 | 0 | | – | – | – | | 0 | 0 | 0 | | 0 | 0 | 0 | | 322 | 13 | 8 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-5.4: Summary of VOC Detections for Ocean County, New Jersey

| | | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 5 | 23 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 7 | 6 |
| NT | TRICHLOROFLUOROMETHANE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 5 | 23 | 0 | NT |
| (1) | VINYLCHLORIDE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 0 | 0 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 5 | 23 | 0 | NT |
| NT | 1,1-DICHLOROETHYLENE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 5 | 23 | 3 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 0 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 3 | 3 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 4 | 4 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 3 | 0 |
| (1) | 1,2-DICHLOROETHANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 0 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 3 | 2 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 6 | 0 |
| (2) | 1,3-DICHLOROBENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 23 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 5 | 23 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 5 | 23 | 0 | NT |
| | TOTALS | | 0 | 0 | 0 | | - | - | - | | 0 | 0 | 0 | | 0 | 0 | 0 | | 299 | 22 | 9 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-6.1: Summary of VOC Detections for Passaic County, New Jersey

| | | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (1) | CARBON TETRACHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | CHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | CHLOROETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | DICHLOROBROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | ETHYLBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | METHYLBROMIDE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | METHYLCHLORIDE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | METHYLENE CHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | TOLUENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| | TOTALS | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | - | - | - | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-6.2: Summary of VOC Detections for Passaic County, New Jersey

| | | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | TRICHLOROFLUOROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | VINYLCHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | 1,1-DICHLOROETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (1) | 1,2-DICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,3-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| | TOTALS | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | - | - | - | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-6.3: Summary of VOC Detections for Passaic County, New Jersey

| | | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | CARBON TETRACHLORIDE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | CHLOROBENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | CHLOROETHANE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| NT | DICHLOROBROMETHANE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | ETHYLBENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | METHYLBROMIDE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| NT | METHYLCHLORIDE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| NT | METHYLENE CHLORIDE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 1 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | TOLUENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTALS | | 0 | 0 | 0 | | - | - | - | | 14 | 1 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-6.4: Summary of VOC Detections for Passaic County, New Jersey

| | | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | TRICHLOROFLUOROMETHANE | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 1 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | VINYLCHLORIDE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| NT | 1,1-DICHLOROETHYLENE | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | 1,2-DICHLOROETHANE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,3-DICHLOROBENZENE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT |
| | TOTALS | | 0 | 0 | 0 | | – | – | – | | 14 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-7.1: Summary of VOC Detections for Somerset County, New Jersey

| | | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (1) | CARBON TETRACHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (2) | CHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| NT | CHLOROETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| NT | DICHLOROBROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| (2) | ETHYLBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| NT | METHYLBROMIDE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| NT | METHYLCHLORIDE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| NT | METHYLENE CHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | – | – | – | NT | 0 | 0 | 0 | NT |
| (2) | TOLUENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | – | – | – | – | 0 | 0 | 0 | 0 |
| | TOTALS | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | – | – | – | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"–" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-7.2: Summary of VOC Detections for Somerset County, New Jersey

| | | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | TRICHLOROFLUOROMETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | VINYLCHLORIDE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| NT | 1,1-DICHLOROETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (1) | 1,2-DICHLOROETHANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| (2) | 1,3-DICHLOROBENZENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | 0 | 0 | 0 | NT | - | - | - | NT | 0 | 0 | 0 | NT |
| | TOTALS | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | | - | - | - | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-7.3: Summary of VOC Detections for Somerset County, New Jersey

| | | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| (1) | BENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | CARBON TETRACHLORIDE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | CHLOROBENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | CHLOROETHANE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 0 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| NT | CIS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 0 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| NT | DICHLOROBROMETHANE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 0 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| NT | DICHLORODIFLUOROMETHANE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 0 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | ETHYLBENZENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | METHYLBROMIDE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 0 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| NT | METHYLCHLORIDE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 0 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| NT | METHYLENE CHLORIDE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | STYRENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | TETRACHLOROETHYLENE | 0 | 0 | 0 | NT | - | - | - | NT | 1 | 1 | 1 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | TOLUENE | 0 | 0 | 0 | 0 | - | - | - | - | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| | TOTALS | | 0 | 0 | 0 | | - | - | - | | 14 | 1 | 0 | | 112 | 0 | 0 | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold Is Based on Proposed Federal MCL
(3) Health Based Threshold Is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"-" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

Table H-7.4: Summary of VOC Dectections for Somerset County, New Jersey

| | | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLATILE ORGANIC CHEMICALS | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| NT | TRANS 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 0 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | TRICHLOROETHYLENE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 1 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | TRICHLOROFLUOROMETHANE | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 0 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | VINYLCHLORIDE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | XYLENE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,1-DICHLOROETHANE | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 0 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| NT | 1,1-DICHLOROETHYLENE | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 0 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | 1,1,1-TRICHLOROETHANE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,1,2-TRICHLOROETHANE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| (3) | 1,1,2,2-TETRACHLOROETHANE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,2-DIBROMOETHYLENE | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 0 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| (2) | 1,2-DICHLOROBENZENE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| (1) | 1,2-DICHLOROETHANE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,2-DICHLOROPROPANE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| (4) | 1,2-TRANS-DICHLOROETHENE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 1 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| (2) | 1,3-DICHLOROBENZENE | 0 | 0 | 0 | 0 | – | – | – | – | 1 | 1 | 0 | 0 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| NT | 1,3-DICHLOROPROPENE | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 0 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| (1) | 2-CHLOROETHYLVINYLETHER | 0 | 0 | 0 | NT | – | – | – | NT | 1 | 1 | 0 | NT | 8 | 8 | 0 | NT | 0 | 0 | 0 | NT |
| | TOTALS | | 0 | 0 | 0 | | – | – | – | | 14 | 1 | 0 | | 112 | 0 | 0 | | 0 | 0 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

(1) Health Based Threshold (HBT) is Based on Final Federal MCL
(2) Health Based Threshold is Based on Proposed Federal MCL
(3) Health Based Threshold is Based on Federal Ambient Water Quality Criteria
NT No Health Based Threshold Available

"–" Signifies that Data are Missing for that Year

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the HBT

# APPENDIX I

## Supplementary Material Describing Nitrate Indicator Information

Table J-1: Summary of Nitrate Detections, New Jersey

| COUNTY | 1980 | | | | 1981 | | | | 1982 | | | | 1983 | | | | 1984 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| CAMDEN | 68 | 69 | 69 | 0 | 0 | 0 | 0 | 0 | 47 | 47 | 20 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| HUNTERDON | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| MONMOUTH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 | 3 | 0 | 0 | 0 | 0 | 0 | 19 | 19 | 0 | 0 |
| MORRIS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 2 | 0 | 1 | 1 | 0 | 0 |
| OCEAN | 0 | 0 | 0 | 0 | 81 | 81 | 60 | 1 | 171 | 171 | 133 | 1 | 7 | 7 | 4 | 0 | 23 | 23 | 1 | 0 |
| PASSAIC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SOMERSET | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Jersey | 68 | 69 | 69 | 0 | 81 | 81 | 60 | 1 | 228 | 228 | 156 | 1 | 14 | 14 | 7 | 0 | 43 | 43 | 1 | 0 |

| COUNTY | 1985 | | | | 1986 | | | | 1987 | | | | 1988 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) | No. Well (A) | No. Sam Takn Anlz (B) | No. Sam Dets (C) | No. Dets Exc MCL (D) |
| CAMDEN | 45 | 49 | 23 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 7 | 7 | 7 | 0 | 3 | 3 | 3 | 0 |
| HUNTERDON | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 7 | 0 | 21 | 23 | 20 | 0 | 2 | 2 | 2 | 0 |
| MONMOUTH | 46 | 46 | 3 | 0 | 4 | 4 | 2 | 0 | 4 | 4 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| MORRIS | 59 | 59 | 39 | 0 | 12 | 12 | 5 | 0 | 81 | 84 | 52 | 0 | 7 | 7 | 6 | 0 | 72 | 117 | 82 | 0 |
| OCEAN | 16 | 16 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 16 | 12 | 0 |
| PASSAIC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 0 | 2 | 2 | 2 | 0 | 4 | 4 | 3 | 0 |
| SOMERSET | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 | 5 | 0 | 11 | 11 | 9 | 0 | 0 | 0 | 0 | 0 |
| New Jersey | 166 | 170 | 66 | 0 | 18 | 18 | 7 | 0 | 104 | 107 | 66 | 0 | 50 | 52 | 44 | 0 | 86 | 142 | 102 | 0 |

Source: National Water Information System (NWIS)
U.S. Geological Survey

MCL: 10.0 mg/L (as nitrogen)

(A) Number of Wells
(B) Number of Samples Taken and Analyzed
(C) Number of Sample Detections
(D) Number of Detections that Exceed the Federal MCL

# APPENDIX K

## Supplementary Material Describing Agricultural Pesticide Usage in New Jersey

Two reports summarizing the information obtained from the 1985 private agricultural pesticide applicator survey in New Jersey are listed below:

(a) "New Jersey Pesticide Use Survey" by Judith B. Louis (DSR NJDEP), Mark G. Robson (NJ Department of Agriculture) and George C. Hamilton (Rutgers University); and,

(b) "Effect of Agricultural Chemicals on Groundwater Quality in the New Jersey Coastal Plain", by Judith B. Louis (DSR, NJDEP) and Eric Vowinkle (USGS, Water Resources Division, New Jersey).

These data are also being used by the USGS to plan projects that will monitor pesticide residues in both ground and surface water.

Other publications are available that contain relevant information on pesticide use in New Jersey. Two recent publications are listed below:

(a) "Relation of Land Use to Ground-water Quality in the Outcrop Area of the Potomac-Raritan Magothy Aquifer System", New Jersey by George R. Kish, Eric F. Vowinkle, Thomas V. Fusillo, and William A. Battaglin. National Water Summary 1986, Ground-Water Quality-Water Quality Issues.

This article evaluates the effects of use activities on the quality of water in the Potomac-Raritan-Magothy aquifer system of New Jersey. It also is an example of non-point source contamination of groundwater. In the northern study area, ground-water samples collected between 1984 and 1985 were analyzed for three types of organic compounds: pesticides (65 wells), phenols (69 wells) and aromatic chlorinated volatile compounds (71 wells). Samples collected in the southern area were not analyzed for pesticides.

Pesticides were detected at low concentrations ($\leq$ 0.5 ug/l) in 7 of the 65 wells (11 percent). Three organochloride insecticides (DDD, lindane and dieldrin) were detected, and two triazine herbicides (atrazine and simazine) were detected. Pesticides were found more frequently in agricultural areas (20 percent) than in other land use areas.

(b) "Preliminary Assessment of Water Quality and Its Relation to Hydrogeology and Land Use: Potomac-Raritan-Magothy Aquifer System, New Jersey", by Cynthia Barton, Eric F. Vowinkle, and John P. Nawyn, USGS, Water Resources Investigations Report, 87-4023, 1987.

For this study, an inventory of ground-water contamination sites and contaminants detected was compiled to determine the types of ground-water contaminants and the areal distribution of contamination. Data were obtained from the New Jersey Ground Water Pollution Index files; the Management Plan 1983-1986 for Hazardous Waste Site Cleanups in New Jersey; the Bureau of Environmental Evaluation and Risk Assessment files; the Emergency Remedial Response Information System (ERRIS) list; and the National Priorities List.

Pesticides were detected at twelve sites. Dieldrin, endrin, chlordane, DDD, DDE, and DDT were most frequently detected. Polychlorinated biphenyls (PCBs) were detected at six sites and phenols at seven sites.

## APPENDIX L

**Summary Data of Agricultural Pesticide Usage by Private Registered Applicators in New Jersey**

# Table L-1

## Total Number of Registrants by County

| County | 1985 | 1988 | Percent Change |
|---|---|---|---|
| ATLANTIC | 249 | 262 | 5.2% |
| BERGEN | 42 | 27 | -35.7% |
| BURLINGTON | 251 | 229 | -8.8% |
| CAMDEN | 35 | 31 | -11.4% |
| CAPE MAY | 32 | 32 | 0.0% |
| CUMBERLAND | 121 | 155 | 28.1% |
| ESSEX | 6 | 7 | 16.7% |
| GLOUCESTER | 198 | 206 | 4.0% |
| HUNTERDON | 146 | 139 | -4.8% |
| MERCER | 59 | 57 | -3.4% |
| MIDDLESEX | 88 | 81 | -8.0% |
| MONMOUTH | 97 | 87 | -10.3% |
| MORRIS | 55 | 57 | 3.6% |
| OCEAN | 26 | 29 | 11.5% |
| PASSAIC | 13 | 13 | 0.0% |
| SALEM | 121 | 129 | 6.6% |
| SOMERSET | 45 | 41 | -8.9% |
| SUSSEX | 42 | 27 | -35.7% |
| UNION | 12 | 8 | -33.3% |
| WARREN | 84 | 86 | 2.4% |
| Total | 1,722 | 1,703 | -1.1% |

# Table L-2

## Fungicides

| County | 1985 | | | 1988 | | | Percent Change | | |
|---|---|---|---|---|---|---|---|---|---|
| | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County |
| ATLANTIC | 136 | 121,080 | 6.2 | 169 | 125,295 | 4.4 | 3.5% | -29.0% | 24.3% |
| BERGEN | 23 | 1,310 | 3.1 | 16 | 1,776 | 3.1 | 35.6% | 0.0% | -30.4% |
| BURLINGTON | 100 | 73,228 | 3.9 | 105 | 69,780 | 4.0 | -4.7% | 2.6% | 5.0% |
| CAMDEN | 19 | 11,682 | 8.3 | 24 | 21,353 | 5.8 | 82.8% | -30.1% | 26.3% |
| CAPE MAY | 10 | 394 | 2.6 | 13 | 837 | 3.9 | 112.3% | 50.0% | 30.0% |
| CUMBERLAND | 50 | 81,487 | 4.9 | 84 | 137,222 | 5.1 | 68.4% | 4.1% | 68.0% |
| ESSEX | 2 | 26 | 1.0 | 3 | 29 | 1.8 | 13.3% | 80.0% | 50.0% |
| GLOUCESTER | 100 | 247,736 | 5.9 | 120 | 301,858 | 3.5 | 21.8% | -40.7% | 20.0% |
| HUNTERDON | 50 | 4,631 | 4.2 | 54 | 7,492 | 4.4 | 61.8% | 4.8% | 8.0% |
| MERCER | 14 | 2,728 | 3.8 | 21 | 4,827 | 3.1 | 76.9% | -18.4% | 50.0% |
| MIDDLESEX | 33 | 10,334 | 2.5 | 29 | 9,753 | 1.5 | -5.6% | -40.0% | -12.1% |
| MONMOUTH | 36 | 8,198 | 3.1 | 43 | 9,608 | 2.8 | 17.2% | -9.7% | 19.4% |
| MORRIS | 30 | 2,894 | 2.8 | 38 | 2,477 | 0.1 | -14.4% | -96.4% | 26.7% |
| OCEAN | 11 | 907 | 1.3 | 16 | 1,557 | 0.9 | 71.6% | -30.8% | 45.5% |
| PASSAIC | 5 | 181 | 2.5 | 7 | 2,933 | 0.3 | 1520.3% | -88.0% | 40.0% |
| SALEM | 38 | 23,258 | 2.0 | 49 | 34,471 | 2.0 | 48.2% | 0.0% | 28.9% |
| SOMERSET | 14 | 1,323 | 4.0 | 14 | 466 | 1.8 | -64.8% | -55.0% | 0.0% |
| SUSSEX | 22 | 4,101 | 4.9 | 16 | 1,953 | 2.6 | -52.4% | -46.9% | -27.3% |
| UNION | 3 | 73 | 16.3 | 5 | 74 | 82.2 | 1.1% | 404.3% | 66.7% |
| WARREN | 24 | 2,552 | 3.0 | 27 | 3,520 | 2.7 | 37.9% | -10.0% | 12.5% |
| Total: | 720 | 598,122 | 4.9 | 853 | 737,280 | 3.2 | 23.3% | -34.8% | 18.5% |

Please note that many of the above values contain extra decimal places that have been rounded off. Percents and averages were computed using the original values.

Source: New Jersey Department of Environmental Protection
Bureau of Pesticide Operations

# Table L-3

## Growth Regulators

| County | 1985 | | | 1988 | | | Percent Change | | |
|---|---|---|---|---|---|---|---|---|---|
| | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County |
| ATLANTIC | 10 | 262 | 0.9 | 10 | 49 | 0.1 | -81.5% | -88.9% | 0.0% |
| BERGEN | 8 | 22 | 3.4 | 5 | 41 | < 0.1 | 81.3% | -100.0% | -37.5% |
| BURLINGTON | 12 | 613 | 1.6 | 9 | 298 | < 0.1 | -51.4% | -100.0% | -25.0% |
| CAMDEN | 2 | 1 | 0.7 | 2 | 2 | < 0.1 | 130.0% | -100.0% | 0.0% |
| CAPE MAY | 1 | 0 | 0.0 | 1 | 0 | < 0.1 | n/a | n/a | n/a |
| CUMBERLAND | 2 | 59 | 1.0 | 6 | 201 | 0.7 | 242.3% | -30.0% | 200.0% |
| ESSEX | 1 | 3 | 6.6 | 0 | 0 | < 0.1 | n/a | -100.0% | -100.0% |
| GLOUCESTER | 16 | 394 | 0.6 | 11 | 80 | 0.4 | -79.8% | -33.3% | -31.3% |
| HUNTERDON | 7 | 23 | 0.8 | 4 | 20 | 1.9 | -12.9% | 137.5% | -42.9% |
| MERCER | 3 | 53 | 0.3 | 3 | 8 | 0.1 | -84.2% | -66.7% | 0.0% |
| MIDDLESEX | 2 | 4 | 2.5 | 4 | 61 | 6.7 | 1535.1% | 168.0% | 100.0% |
| MONMOUTH | 1 | 0 | 0.1 | 5 | 40 | 0.7 | n/a | 600.0% | 400.0% |
| MORRIS | 9 | 136 | 1.0 | 15 | 153 | < 0.1 | 12.0% | -100.0% | 66.7% |
| OCEAN | 1 | 13 | 25.0 | 2 | 1 | 2.2 | -91.2% | -91.2% | 100.0% |
| PASSAIC | 0 | 0 | 0.0 | 1 | 1,275 | 0.8 | n/a | n/a | n/a |
| SALEM | 4 | 92 | 0.9 | 9 | 853 | 1.3 | 826.6% | 44.4% | 125.0% |
| SOMERSET | 3 | 32 | 6.6 | 4 | 17 | 8.3 | -48.3% | 25.8% | 33.3% |
| SUSSEX | 3 | 37 | 0.3 | 4 | 2 | 0.4 | -95.4% | 33.3% | 33.3% |
| UNION | 1 | 40 | 11.3 | 2 | 45 | < 0.1 | 14.1% | -100.0% | 100.0% |
| WARREN | 3 | 11 | 0.7 | 4 | 17 | 0.2 | 56.4% | -71.4% | 33.3% |
| Total: | 89 | 1,795 | 0.9 | 101 | 3,161 | 0.9 | 76.1% | 1.0% | 13.5% |

Please note that many of the above values contain extra decimal places that have been rounded off. Percents and averages were computed using the original values.

Source: New Jersey Deparment of Environmental Protection
Bureau of Pesticide Operations

# Table L-4

## Herbicides

| County | 1985 | | | 1988 | | | Percent Change | | |
|---|---|---|---|---|---|---|---|---|---|
| | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County |
| ATLANTIC | 99 | 25,978 | 1.9 | 153 | 28,857 | 1.7 | 11.1% | -10.5% | 54.5% |
| BERGEN | 16 | 337 | 1.5 | 9 | 419 | 4.6 | 24.3% | 206.7% | -43.8% |
| BURLINGTON | 165 | 91,144 | 1.2 | 150 | 74,272 | 1.1 | -18.5% | -8.3% | -9.1% |
| CAMDEN | 14 | 2,771 | 1.3 | 14 | 2,790 | 0.2 | 0.7% | -84.6% | 0.0% |
| CAPE MAY | 18 | 4,090 | 2.0 | 13 | 5,841 | 1.9 | 42.8% | -5.0% | -27.8% |
| CUMBERLAND | 73 | 40,780 | 1.4 | 110 | 49,111 | 1.1 | 20.4% | -21.4% | 50.7% |
| ESSEX | 1 | 22 | 0.7 | 4 | 705 | 0.9 | 3148.4% | 28.6% | 300.0% |
| GLOUCESTER | 91 | 19,391 | 0.8 | 139 | 38,959 | 1.1 | 100.9% | 37.5% | 52.7% |
| HUNTERDON | 99 | 38,172 | 1.4 | 99 | 26,437 | 1.3 | -30.7% | -7.1% | 0.0% |
| MERCER | 41 | 31,786 | 1.2 | 42 | 21,835 | 0.9 | -31.3% | -25.0% | 2.4% |
| MIDDLESEX | 40 | 16,331 | 0.9 | 54 | 28,455 | 1.0 | 74.2% | 11.1% | 35.0% |
| MONMOUTH | 54 | 35,142 | 1.6 | 50 | 20,419 | 1.3 | -41.9% | -18.8% | -7.4% |
| MORRIS | 23 | 6,068 | 1.6 | 30 | 5,646 | 0.4 | -6.9% | -75.0% | 30.4% |
| OCEAN | 14 | 5,697 | 1.1 | 15 | 7,414 | 1.3 | 30.1% | 18.2% | 7.1% |
| PASSAIC | 3 | 116 | 2.5 | 4 | 310 | 2.9 | 167.6% | 16.0% | 33.3% |
| SALEM | 88 | 101,155 | 2.4 | 99 | 94,223 | 1.9 | -6.9% | -20.8% | 12.5% |
| SOMERSET | 29 | 15,046 | 1.2 | 27 | 8,639 | 1.1 | -42.6% | -8.3% | -6.9% |
| SUSSEX | 23 | 3,199 | 2.2 | 16 | 2,902 | 1.5 | -9.3% | -31.8% | -30.4% |
| UNION | 3 | 25 | 1.9 | 4 | 119 | 5.4 | 372.1% | 184.2% | 33.3% |
| WARREN | 68 | 34,862 | 1.5 | 67 | 28,957 | 1.6 | -16.9% | 6.7% | -1.5% |
| Total: | 962 | 472,112 | 1.4 | 1099 | 446,309 | 1.2 | -5.5% | -15.5% | 14.2% |

Please note that many of the above values contain extra decimal places that have been rounded off. Percents and averages were computed using the original values.

Source: New Jersey Department of Environmental Protection
Bureau of Pesticide Operations

# Table L-5

## Insecticides

| County | 1985 | | | 1988 | | | Percent Change | | |
|---|---|---|---|---|---|---|---|---|---|
| | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County |
| ATLANTIC | 239 | 69,345 | 1.4 | 254 | 67,539 | 1.5 | -2.6% | 7.1% | 6.3% |
| BERGEN | 42 | 4,787 | 5.3 | 27 | 1,485 | 2.1 | -69.0% | -60.4% | -35.7% |
| BURLINGTON | 202 | 58,969 | 1.3 | 184 | 63,998 | 1.4 | 8.5% | 7.7% | -8.9% |
| CAMDEN | 33 | 4,446 | 1.3 | 29 | 6,761 | 2.1 | 52.1% | 61.5% | -12.1% |
| CAPE MAY | 26 | 3,607 | 2.3 | 28 | 1,070 | 0.7 | -70.3% | -69.6% | 7.7% |
| CUMBERLAND | 100 | 53,940 | 1.1 | 126 | 141,873 | 2.6 | 163.0% | 136.4% | 26.0% |
| ESSEX | 6 | 284 | 4.0 | 6 | 32 | 0.6 | -88.7% | -85.0% | 0.0% |
| GLOUCESTER | 179 | 84,543 | 1.3 | 183 | 77,874 | 0.8 | -7.9% | -38.5% | 2.2% |
| HUNTERDON | 99 | 6,405 | 1.4 | 87 | 4,447 | 1.1 | -30.6% | -21.4% | -12.1% |
| MERCER | 42 | 12,640 | 1.1 | 38 | 10,226 | 1.9 | -19.1% | 72.7% | -9.5% |
| MIDDLESEX | 77 | 13,522 | 0.6 | 69 | 10,964 | 1.0 | -18.9% | 66.7% | -10.4% |
| MONMOUTH | 83 | 16,936 | 1.2 | 71 | 10,498 | 1.1 | -38.0% | -8.3% | -14.5% |
| MORRIS | 48 | 7,209 | 3.9 | 53 | 4,087 | 0.2 | -43.3% | -94.9% | 10.4% |
| OCEAN | 21 | 6,553 | 1.5 | 22 | 10,410 | 1.9 | 58.9% | 26.7% | 4.8% |
| PASSAIC | 11 | 306 | 1.1 | 13 | 3,174 | 0.8 | 935.9% | -27.3% | 18.2% |
| SALEM | 95 | 44,501 | 1.4 | 100 | 138,020 | 3.8 | 210.2% | 171.4% | 5.3% |
| SOMERSET | 29 | 2,592 | 1.1 | 28 | 4,195 | 3.6 | 61.8% | 227.3% | -3.4% |
| SUSSEX | 35 | 3,759 | 1.4 | 20 | 2,577 | 2.9 | -31.5% | 107.1% | -42.9% |
| UNION | 11 | 653 | 8.2 | 8 | 2,216 | 49.4 | 239.2% | 502.4% | -27.3% |
| WARREN | 60 | 12,589 | 1.5 | 58 | 8,436 | 1.2 | -33.0% | -20.0% | -3.3% |
| Total: | 1438 | 407,585 | 1.3 | 1404 | 569,882 | 1.6 | 39.8% | 26.4% | -2.4% |

Please note that many of the above values contain extra decimal places that have been rounded off. Percents and averages were computed using the original values.

Source: New Jersey Department of Environmental Protection
Bureau of Pesticide Oeprations

# Table L-6

## Fumigants

| County | 1985 | | | 1988 | | | Percent Change | | |
|---|---|---|---|---|---|---|---|---|---|
| | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County |
| ATLANTIC | 52 | 5,384 | 2.9 | 44 | 8,768 | 17.6 | 62.8% | 506.9% | -15.4% |
| BERGEN | 7 | 80 | 11.5 | 10 | 351 | 350.6 | 336.1% | 2948.7% | 42.9% |
| BURLINGTON | 29 | 17,427 | 6.1 | 17 | 1,351 | 5.1 | -92.2% | -16.4% | -41.4% |
| CAMDEN | 11 | 639 | 3.9 | 5 | 950 | 25.3 | 48.6% | 548.7% | -54.5% |
| CAPE MAY | 3 | 230 | 17.0 | 2 | 315 | 31.5 | 37.3% | 85.3% | -33.3% |
| CUMBERLAND | 14 | 1,728 | 1.3 | 20 | 15,724 | 14.2 | 810.0% | 992.3% | 42.9% |
| ESSEX | 1 | 2 | 3.2 | 1 | 4 | 1.3 | 150.0% | -59.4% | 0.0% |
| GLOUCESTER | 36 | 18,032 | 4.1 | 41 | 14,351 | 1.7 | -20.4% | -58.5% | 13.9% |
| HUNTERDON | 10 | 462 | 4.0 | 13 | 637 | 7.8 | 37.9% | 95.0% | 30.0% |
| MERCER | 6 | 148 | 3.5 | 7 | 1,694 | 6.1 | 1048.7% | 74.3% | 16.7% |
| MIDDLESEX | 13 | 668 | 0.8 | 13 | 1,076 | 1.2 | 61.2% | 50.0% | 0.0% |
| MONMOUTH | 12 | 2,202 | 9.3 | 13 | 1,801 | 0.2 | -18.2% | -97.8% | 8.3% |
| MORRIS | 14 | 710 | 11.1 | 23 | 1,364 | 0.1 | 92.1% | -99.1% | 64.3% |
| OCEAN | 1 | 4 | 8.0 | 2 | 414 | 14.5 | 10260.0% | 81.3% | 100.0% |
| PASSAIC | 4 | 2,825 | 209.2 | 4 | 136 | 15.1 | -95.2% | -92.8% | 0.0% |
| SALEM | 17 | 4,592 | 1.4 | 6 | 2,320 | 13.5 | -49.5% | 864.3% | -64.7% |
| SOMERSET | 4 | 96 | 3.5 | 6 | 210 | 7.0 | 119.2% | 100.0% | 50.0% |
| SUSSEX | 4 | 83 | 3.1 | 5 | 47 | 4.7 | -42.7% | 51.6% | 25.0% |
| UNION | 2 | 2 | 2.0 | 4 | 59 | 0.0 | 2830.0% | -100.0% | 100.0% |
| WARREN | 12 | 997 | 3.1 | 7 | 604 | 11.6 | -39.4% | 274.2% | -41.7% |
| Total: | 252 | 56,309 | 3.6 | 243 | 52,177 | 1.5 | -7.3% | -58.2% | -3.6% |

Please note that many of the above values contain extra decimal places that have been rounded off. Percents and averages were computed using the original values.

Source: New Jersey Department of Environmental Protection,
Bureau of Pesticide Operations

# Table L-7

## Rodenticides

| County | 1985 | | | 1988 | | | Percent Change | | |
|---|---|---|---|---|---|---|---|---|---|
| | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County |
| ATLANTIC | 1 | 10 | 0.1 | 0 | 0 | 0 | n/a | n/a | n/a |
| BERGEN | 0 | 0 | 0 | 0 | 0 | 0 | n/a | n/a | n/a |
| BURLINGTON | 0 | 0 | 0 | 0 | 0 | 0 | n/a | n/a | n/a |
| CAMDEN | 0 | 0 | 0 | 1 | 1 | < 0.1 | n/a | n/a | n/a |
| CAPE MAY | 0 | 0 | 0 | 0 | 0 | 0 | n/a | n/a | n/a |
| CUMBERLAND | 0 | 0 | 0 | 0 | 0 | 0 | n/a | n/a | n/a |
| ESSEX | 0 | 0 | 0 | 0 | 0 | 0 | n/a | n/a | n/a |
| GLOUCESTER | 0 | 0 | 0 | 1 | 0.1 | < 0.1 | n/a | n/a | n/a |
| HUNTERDON | 3 | 17.6 | 0.2 | 2 | 2.4 | 0.1 | -86.4% | -50.0% | -33.3% |
| MERCER | 1 | 9.8 | 0.2 | 0 | 0 | 0 | n/a | n/a | n/a |
| MIDDLESEX | 0 | 0 | 0 | 1 | 1 | < 0.1 | n/a | n/a | n/a |
| MONMOUTH | 0 | 0 | 0 | 0 | 0 | 0 | n/a | n/a | n/a |
| MORRIS | 0 | 0 | 0 | 1 | 20.5 | < 0.1 | n/a | n/a | n/a |
| OCEAN | 0 | 0 | 0 | 0 | 0 | 0 | n/a | n/a | n/a |
| PASSAIC | 0 | 0 | 0 | 0 | 0 | 0 | n/a | n/a | n/a |
| SALEM | 0 | 0 | 0 | 0 | 0 | 0 | n/a | n/a | n/a |
| SOMERSET | 1 | 0.8 | 0.3 | 1 | 1 | < 0.1 | 25.0% | -100.0% | n/a |
| SUSSEX | 0 | 0 | 0 | 0 | 0 | 0 | n/a | n/a | n/a |
| UNION | 0 | 0 | 0 | 0 | 0 | 0 | n/a | n/a | n/a |
| WARREN | 0 | 0 | 0 | 1 | 3.6 | 0.2 | n/a | n/a | n/a |
| Total: | 6 | 38 | 0.2 | 8 | 30 | 0.7 | -22.5% | 342.2% | 33.3% |

Please note that many of the above values contain extra decimal places that have been rounded off. Percents and averages were computed using the original values.

Source: New Jersey Department of Environmental Protection,

# Table L-8

## Miscellaneous

| County | 1985 | | | 1988 | | | Percent Change | | |
|---|---|---|---|---|---|---|---|---|---|
| | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Amount of Active Ingredient [lbs] | Average Application Rate [lbs/acre] | Number of Registrants in County |
| ATLANTIC | 51 | 5,488 | 2.1 | 38 | 3,506 | 1.6 | -36.1% | -23.8% | -25.5% |
| BERGEN | 1 | 0 | 0.1 | 0 | 0 | 0.0 | n/a | n/a | n/a |
| BURLINGTON | 22 | 3,891 | 2.1 | 19 | 1,673 | 1.1 | -57.0% | -47.6% | -13.6% |
| CAMDEN | 4 | 56 | 0.7 | 2 | 1 | 0.4 | -97.7% | -42.9% | -50.0% |
| CAPE MAY | 2 | 38 | 7.7 | 2 | 33 | < 0.1 | -14.1% | -100.0% | 0.0% |
| CUMBERLAND | 21 | 7,552 | 1.0 | 30 | 4,002 | 0.3 | -47.0% | -70.0% | 42.9% |
| ESSEX | 0 | 0 | 0.0 | 1 | 3 | 3.2 | n/a | n/a | n/a |
| GLOUCESTER | 35 | 1,562 | 0.6 | 38 | 1,245 | 0.2 | -20.3% | -66.7% | 8.6% |
| HUNTERDON | 7 | 9 | 0.1 | 6 | 774 | 6.4 | 8135.1% | 6300.0% | -14.3% |
| MERCER | 5 | 248 | 1.2 | 6 | 850 | 3.9 | 242.6% | 225.0% | 20.0% |
| MIDDLESEX | 7 | 1,283 | 1.1 | 5 | 40 | 0.1 | -96.9% | -90.9% | -28.6% |
| MONMOUTH | 11 | 508 | 0.6 | 8 | 371 | 0.8 | -27.1% | 33.3% | -27.3% |
| MORRIS | 3 | 16 | 0.4 | 4 | 86 | 0.3 | 431.5% | -25.0% | 33.3% |
| OCEAN | 1 | 2 | 0.3 | 4 | 274 | 12.4 | 13600.0% | 4033.3% | 300.0% |
| PASSAIC | 0 | 0 | 0.0 | 0 | 0 | 0.0 | n/a | n/a | n/a |
| SALEM | 18 | 6,386 | 2.8 | 11 | 593 | 0.4 | -90.7% | -85.7% | -38.9% |
| SOMERSET | 1 | 28 | 55.8 | 1 | 14 | 0.3 | -51.3% | -99.5% | 0.0% |
| SUSSEX | 3 | 915 | 11.4 | 0 | 0 | 0.0 | n/a | n/a | n/a |
| UNION | 1 | 1 | 1.4 | 0 | 0 | 0.0 | n/a | n/a | n/a |
| WARREN | 3 | 22 | 1.3 | 7 | 2,499 | 6.4 | 11208.6% | 392.3% | 133.3% |
| Total: | 196 | 28,006 | 1.4 | 182 | 15,964 | 0.6 | -43.0% | -58.5% | -7.1% |

Please note that many of the above values contain extra decimal places that have been rounded off. Percents and averages were computed using the original values.

Source: New Jersey Department of Environmental Protection,
Bureau of Pesticide Operations

# Table L-9.1

## Chemicals by Pesticide Type

| Fungicides |
|---|
| ANILAZINE |
| BARIUM POLYSULFIDE |
| BARIUM SULFIDE |
| BENOMYL |
| CAPTAFOL |
| CAPTAN |
| CHLOROTHALONIL |
| COPPER |
| COPPER HYDROXIDE |
| COPPER SULFATE |
| DICHLONE |
| DICLORAN |
| DINOCAP |
| DODEMORPH |
| DODINE |
| ETRIDIAZOLE |
| FENAMINOSULF |
| FENARIMOL |
| FERBAM |
| FOLPET |
| FOSETYL-AL |
| GLYODIN |
| IPRODIONE |
| MANCOZEB |
| MANEB |
| METALAXYL |
| METIRAM |
| OXYTHIOQUINOX |
| PIPERALIN |
| PROPICONAZOLE |
| QUINTOZENE |
| SULFUR |
| THIABENDAZOLE |
| THIOPHANATE |
| THIRAM |
| TRIADIMEFON |
| TRIFORINE |
| VINCLOZOLIN |
| ZINEB |
| ZIRAM |

## Table L-9.2

### Chemicals by Pesticide Type

| Growth Regulators |
|---|
| ANCYMIDOL |
| CHLORMEQUAT CHLORIDE |
| DAMINOZIDE |
| ETHEPHON |
| GIBBERELLIN |
| KINOPRENE |
| NAA |
| NAD |
| PACLOBUTRAZOL |

## Table L-9.3

### Chemicals by Pesticide Type

| Herbicides |
|---|
| 2,4-D |
| ACIFLUORFEN |
| ALACHLOR |
| ALLIDOCHLOR |
| AMITROL |
| AMMONIUM SULFATE |
| ATRAZINE |
| BENFLURALIN |
| BENSULIDE |
| BENTAZON |
| BICEP |
| BROMACIL |
| BROMOXYNIL |
| BRONCO |
| BULLET |
| BUTYLATE |
| CHLORAMBEN |
| CHLOREA |
| CHLORIDAZON |
| CHLORIMURON ETHYL |
| CHLOROXURON |
| CHLORPROPHAM |
| CHLORTHAL-DIMETHYL |
| CLOMOZONE |
| COMMENCE |
| CROSSBOW |
| CYANAZINE |

# Table L-9.3 Con't

## Chemicals by Pesticide Type

| Herbicides (continued) |
|---|
| CYCLOATE |
| DALAPON |
| DICAMBA |
| DICHLOBENIL |
| DIETHATYL ETHYL |
| DINOSEB |
| DIPHENAMID |
| DIQUAT |
| DIURON |
| DSMA |
| EPTC |
| EXTRAZINE |
| FENOXAPROP-ETHYL |
| FLUAZIFOP-BUTYL |
| GEMINI |
| GLYPHOSATE |
| HEXAZINONE |
| IMAZAQUIN |
| IMAZETHAPYR |
| LACTOFEN |
| LARIAT |
| LESCO 3 WAY |
| LINURON |
| MCPP |
| METOLACHLOR |
| METRIBUZIN |
| MSMA |
| NAPROPAMIDE |
| NAPTALAM |
| NORFLURAZON |
| OH2 |
| ORYZALIN |
| OXADIAZON |
| OXYFLUORFEN |
| PARAQUAT |
| PEBULATE |
| PENDIMETHALIN |
| PHENMEDIPHAM |
| PICLORAM |
| PRELUDE |
| PROMETON |
| PRONAMIDE |
| PROPACHLOR |
| PROZINE |
| QUIZALOFOP-ETHYL |

## Table L-9.3 Con't

### Chemicals by Pesticide Type

| Herbicides (continued) |
|---|
| ROUT |
| SALUTE |
| SETHOXYDIM |
| SIDURON |
| SIMAZINE |
| SQUADRON |
| SULFALLATE |
| SUTAZINE |
| TEBUTHIURON |
| TERBACIL |
| TRIFLURALIN |
| TRIMEC |

## Table L-9.4

### Chemicals by Pesticide Type

| Insecticides |
|---|
| ABAMECTIN |
| ACEPHATE |
| ALDICARB |
| ALFALFA 22E |
| ALFA-TOX |
| AMITRAZ |
| AZINOPHOS-METHYL |
| BAYTHROID |
| BENDIOCARB |
| BIFENTHRIN |
| BT |
| CARBARYL |
| CARBOFURAN |
| CARBOPHENOTHION |
| CHLORPYRIFOS |
| CROTOXYPHOS |
| CYHEXATIN |
| CYPERMETHRIN |
| DDVP |
| DEMETON |
| DIAZINON |
| DICHLORVOS |
| DICOFOL |
| DIENOCHLOR |
| DIFLUBENZURON |

# Table L-9.4 Con't

## Chemicals by Pesticide Type

| Insecticides (continued) |
|---|
| DIMETHOATE |
| DISULFOTAN |
| DISULFOTON |
| DYMET |
| ENDOSULFAN |
| ETHION |
| ETHOPROP |
| FENAMIPHOS |
| FENBUTATIN OXIDE |
| FENSULFOTHION |
| FENTHION |
| FENVALERATE |
| FLUCYTHRINATE |
| FLUVALINATE |
| FONOFOS |
| FORMETANATE |
| ISOFENPHOS |
| ISOTOX SEED |
| LEAD ARSENATE |
| LINDANE |
| MALATHION |
| METHAMIDOPHOS |
| METHIOCARB |
| METHOMYL |
| METHOXYCHLOR |
| METHYL OCTANOATE |
| MEVINPHOS |
| MEXACARBATE |
| NALED |
| NICOTINE |
| OIL/ETHION |
| OIL/SEVIN |
| OXAMYL |
| OXYDEMETON |
| PARATHION |
| PARATHION-METHYL |
| PERMETHRIN |
| PETROLEUM OILS |
| PHENOTHRIN |
| PHORATE |
| PHOSALONE |
| PHOSMET |
| PHOSPHAMIDON |
| PIRIMICARB |

## Table L-9.4 Con't

### Chemicals by Pesticide Type

| Insecticides (continued) |
|---|
| PIRIMIPHOS |
| PROPARGITE |
| PROPOXUR |
| PYRETHRIN |
| RESMETHRIN |
| ROTENONE |
| SOAP |
| SODIUM ALUMINOFLUORIDE |
| TERBUFOS |
| THIODICARB |
| TRICHLORFON |

## Table L-9.5

### Chemicals by Pesticide Type

| Rodenticides |
|---|
| ZINC PHOSPHIDE |

## Table L-9.6

### Chemicals by Pesticide Type

| Fumigants |
|---|
| ALUMINUM PHOSPHIDE |
| BANROT |
| DIKAR |
| DITHANE |
| METHAM-SODIUM |
| METHYL BROMIDE |
| METHYL ISOTHIOCYANATE |
| PROTECTOR |
| RIDOMIL/BRAVO |
| SULFOTEP |
| VINCLOZALIN |

# Table L-9.7

## Chemicals by Pesticide Type

| Miscellaneous |
|---|
| AMILON |
| BORIC ACID |
| CALCIUM CHLORIDE |
| CHARGER |
| CHLOROPHACINONE |
| CLOFENTEZINE |
| DICHLOROPROPENE |
| DIPHENYLAMINE |
| DVPP |
| ENDOTHALL |
| ETHAZOL |
| IMAZAPYR |
| INDOLE-3-BUTYRIC ACID |
| METALDEHYDE |
| METAM-SODIUM |
| METHIDATION |
| OXATETRACYCLINE |
| PETAN |
| PHOSETHYL-AL |
| PHYSAN |
| PIPERONYL BUTOXIDE |
| RED ARROW |
| SALT |
| SALT(MAGNESIUM SULFATE) |
| SODIUM CHLORATE BORATE |
| SP,ST,AD,DEFOAM |
| STOP-IT |
| STREPTOMYCIN |
| SULFONYLUREA |
| TREATER |
| TRIPLE PLUS |
| VERNOLATE |

# APPENDIX M

## Supplementary Material on Additional Indicators in New Jersey

Two studies concerning additional indicators, sodium and chloride, are summarized below:

(a) "Ground-Water Quality in East-Central New Jersey, and a Plan for Sampling Networks", by Douglas A. Harriman and B. Pierre Sargent. U.S.G.S. Water Resources Investigations Report 85-4243.

Of the 36 wells sampled in the Englishtown Aquifer, sodium exceeded drinking water standards in samples from three wells more than 800 feet deep. For the Manasquan aquifer, 19 analyses of water from 13 wells indicated that the water was generally safe for drinking, however, some constituents exceeded standards, including some sodium concentrations. Chloride exceeded drinking water standards in some areas where samples were drawn from the Kirkwood-Cohansey aquifer system.

(b) "Water-Quality Data for Aquifers in East-Central New Jersey, 1981-82", by Douglas A. Harriman and Lois M. Voronin, U.S.G.S. Open-file Report 84-821.

In Ocean County, major sources of ground-water contamination include: salt-water intrusion, septic systems, landfills and disposal sites. Of the 162 Kirkwood-Cohansey wells sampled, Brick Township Well 5 was highest in chloride (300 mg/L) and sodium (197 mg/L) concentrations.

## APPENDIX N

## Data Specification Form

## SAMPLE DATA SPECIFICATIONS FORM

**FILE** _____

**TAPE VOLSER/DISKETTE LABEL** _____

**FILE SIZE** _____

**RECORD LENGTH** _____ **BLOCK SIZE** _____

**FORMAT** _____

**GENERAL COMMENTS** _____

| POSITION FROM | TO | VARIABLE DESCRIPTION | UNITS | FORMAT |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# APPENDIX O

## Summary of Ground-Water Indicator Data in New Jersey

The following table outlines the State agencies that track indicator data and describes the relevant data bases and types of data collected. In several cases, more than one agency or organization tracks relevant information.

| Indicator | Responsible Agency | Data Base/Type of Information |
|---|---|---|
| MCLs | Bureau of Safe Drinking | BSDW tracks analytical testing results supplied by purveyors for 26 State mandated MCLs. BSDW also tracks compliance information for public water systems on a separate PC-based system. |
| Nitrates | New Jersey Geological Survey, Bureau of Ground Water Resource Evaluation | NJGS is currently sampling the Highland physiographic province as part of its ambient ground-water quality network. Previous sampling of up to 100 wells per year has been conducted throughout the State. The data is maintained in paper files at NJGS and in the USGS WATSTORE data base. |
| | NJ DEP/Division of Science and Research | DSR is conducting studies of agricultural chemical impacts in selected areas of New Jersey. DSR completed a survey in 1988 of 81 wells for nitrate and pesticide metabolite levels in two aquifers of the Coastal Plain. DSR is currently sampling wells in the Northern bedrock aquifers of the State. The study data resides on a PC-based format as well as in the USGS WATSTORE system. |
| | Ocean County Department Public Health | Ocean County passed a local ordinance in May 1987 which requires property owners to test ground-water wells whenever a new well is drilled or property is transferred. Ocean County requires testing for 26 constituents, including nitrates and most of the other New Jersey MCL constituents, and maintains the data on a mini-computer. |
| VOCs | Ocean County Department Public Health | Ocean County passed a local ordinance in May 1987 which requires property owners to test ground-water wells whenever a new well is drilled or property is transferred. Ocean County requires testing for 26 constituents, including most of the New Jersey MCL constituents, and maintains the data on a mini-computer. |
| | NJ DEP/Bureau of Data | BDM maintains a data base for the New Jersey Pollutant Discharge Elimination System (NJPDES). The data base tracks monitoring data for 930 final permits that encompass ground-water monitoring activities. Many of these sites are hazardous waste sites permitted under the RCRA program. |
| | Bureau of Safe Drinking Water | BSDW tracks analytical testing results supplied by purveyors for 26 State--mandated MCLs, including VOCs. BSDW also tracks compliance information of public water systems on a separate PC-based system. |
| Hazardous Waste Sites | NJ DEP Bureau of Planning and Assistance | BPA is responsible for evaluating sites to determine the need for remedial action, set case management priorities, assign remedial cases to the appropriate bureaus, and develop strategic planning initiative. BPA tracks the site status for RCRA corrective action, CERCLA National Priority List, major Responsible Party clean up, and some ECRA identified sites in the MRATS data base. |
| | NJ DEP Bureau of Ground-Water Pollution Assessment | BGWPA is responsible for conducting area-wide hydrogeologic studies in support of the underground storage tank and NJPDES programs. BGWPA has compiled the ground-water pollution inventory data base (GWPIDB) to track the status of site investigations State-wide. In addition, BGWPA has compiled more detailed site status information for 7 of the 21 counties in the State. |