# SOIL GAS SURVEY

# MOBIL HANGAR

# WESTCHESTER COUNTY AIRPORT

# NEW YORK

360037

PREPARED FOR

MOBIL ENVIRONMENTAL AND HEALTH SCIENCE LABORATORY

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## EXECUTIVE SUMMARY

On January 8, 1991, TARGET Environmental Services, Inc. (TARGET) conducted a soil gas survey at the Mobil Hangar, Westchester County Airport, Westchester County, New York, where chlorinated contaminants were detected in shallow soil borings. Samples, which were collected through the floor inside the hangar, were analyzed by GC/ECD for chlorinated hydrocarbons.

Extremely high levels of several chlorinated hydrocarbons were present within the survey area. The most prominent of these was 1,1,1-trichloroethane (1,1,1-TCA). The highest concentrations were observed in the central portion of the survey area north of the borings, but high levels extended throughout the survey area. Although markedly lower in concentration than 1,1,1-TCA, exceptionally high levels of 1,1-dichloroethane (1,1-DCA), tetrachloroethane (PCE), and 1,1-dichloroethene (1,1-DCE) were also present, particularly in the central and/or northwestern portions of the survey area. High levels of cis-1,2-dichloroethene (c-1,2-DCE) and trichloroethene (TCE) were present within the survey area. Chloroform levels were moderate in the central survey area and relatively low in the surrounding samples.

Extremely high levels of 1,1,1-TCA, 1,1-DCA, PCE, and 1,1-DCE, moderately high levels of c-1,2-DCE and TCE and moderate levels of chloroform are present in the shallow subsurface beneath the hangar floor. The extremely high levels of many of these analytes on the survey boundaries would indicate that the full extent of the contamination has not been defined.

## Introduction

A drum of cleaning solvent was determined to have leaked inside the Mobil Hangar at the Westchester County Airport in Westchester County, New York. Soil borings revealed the presence of chlorinated compounds in the shallow subsurface. Mobil Environmental and Health Science Laboratory contracted TARGET Environmental Services, Inc. (TARGET) to perform a soil gas survey in order to determine the extent of the contamination prior to transfer of the property. The field phase of the soil gas survey was conducted on January 8, 1991.

## Detectability

The soil gas survey data presented in this report are the result of precise sampling and measurement of contaminant concentrations in the vadose zone. Analyte detection at a particular location is representative of vapor, dissolved, and/or liquid phase contamination at that location. The presence of detectable levels of target analytes in the vadose zone is dependent upon several factors, including the presence of vapor-phase hydrocarbons or dissolved or liquid concentrations adequate to facilitate volatilization into the unsaturated zone.

## Terminology

In order to prevent misunderstanding of certain terms used in this report, the following clarifications are offered:

The term "feature" is used in reference to a discernible pattern in the contoured data. It denotes a contour form rather than a definite or separate chemical occurrence.

The term "occurrence" is used to indicate an area where chemical compounds are present in sufficient concentrations to be detected by the analysis of soil vapors. The term is not indicative of any specific mode of occurrence (vapor, dissolved, etc.), and does not necessarily indicate or suggest the presence of "free product" or "phase-separated hydrocarbons."

The term "anomaly" refers to an area where hydrocarbons were measured in excess of what would normally be considered "natural" or "background" levels.

The term "analyte" refers to any of the hydrocarbons standardized for quantification in the chromatographic analysis.

The term "vadose zone" represents the unsaturated zone between the ground water table and the ground surface.

The term "indicates" is used when evidence dictates a unique conclusion. The term "suggests" is used when several explanations of certain evidence are possible, but one in particular seems more likely. As a result, "indicates" carries a higher degree of confidence in a conclusion than does "suggests."

## Discussion and Interpretation of Results

In order to provide graphic presentation of the results, individual data sets in Table 1 have been mapped and contoured to produce Figures 2 through 8. Dashed contours are used where patterns are extrapolated into areas of less complete data, or as auxiliary contours.

Extremely high levels of several chlorinated hydrocarbons were present within the survey area. The most prominent of these was 1,1,1-trichloroethane (1,1,1-TCA, Figure 2). The highest concentrations were present in the central portion of the survey area north of the borings, but high levels extended throughout the survey area.

Although markedly lower in concentration than 1,1,1-TCA, exceptionally high levels of 1,1-dichloroethane (1,1-DCA, Figure 3) were also present throughout the central and northwestern portions of the survey area. The areal extent of extremely high levels of tetrachloroethane (PCE, Figure 4) and 1,1-dichloroethene (1,1-DCE, Figure 5) was smaller than for the previously mentioned analytes, but moderately high concentrations were present in the majority of the remaining samples. High levels of trichloroethene (TCE, Figure 6) were present in the northwestern portion of the survey area with more moderate concentrations throughout most of the remaining survey area and relatively low levels in the eastern and western sampling points along the wall. A band of high levels of cis-1,2-dichloroethene (c-1,2-DCE, Figure 7) extended from the wall northward to the survey boundary. Lower levels occurred to the west and southeast. C-1,2-DCE was not observed above its

detection limit in samples from the eastern portion of the survey area. Chloroform levels (Figure 8) were moderate in the central survey area and relatively low in the surrounding samples.

Extremely high levels of 1,1,1-TCA, 1,1-DCA, PCE, and 1,1-DCE, moderately high levels of c-1,2-DCE and TCE and moderate levels of chloroform are present in the shallow subsurface beneath the hangar floor. These compounds may have been components of the original solvent mixture or they may be breakdown products formed when the original compound(s) underwent transformation in the subsurface. The extremely high levels of some of these analytes on the survey boundaries would indicate that the full extent of the contamination has not been defined.

## TABLE 1 (cont)

LABORATORY RESULTS
ELECTRON CAPTURE DETECTOR ANALYSIS
CONCENTRATIONS IN MICROGRAMS PER LITER

| SAMPLE | 11DCE | MC | t12DCE | 11DCA | c12DCE | CF | 111TCA | CT | TCE | 112TCA | PCE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **FIELD CONTROL SAMPLES** | | | | | | | | | | | |
| 1 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <0.10 | 0.39 | <0.05 | <0.10 | <0.10 | <0.05 |
| 2 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <0.10 | 20 | <0.05 | 0.61 | <0.10 | 3.34 |
| **LABORATORY DUPLICATE ANALYSES** | | | | | | | | | | | |
| 10 | 419 | <1.0 | <1.0 | 1,043 | <1.0 | 2.7 | 16,280 | <0.05 | 11 | <0.10 | 269 |
| 10R | 387 | <1.0 | <1.0 | 874 | <1.0 | 2.4 | 16,060 | <0.05 | 11 | <0.10 | 254 |
| 20 | 44 | <1.0 | <1.0 | 239 | <1.0 | <0.10 | 87 | <0.05 | 6.4 | <0.10 | 5.5 |
| 20R | 44 | <1.0 | <1.0 | 354 | 61 | <0.10 | 42 | <0.05 | 22 | <0.10 | 8.6 |
| **LABORATORY BLANKS** | | | | | | | | | | | |
| BMMWN-1 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <0.10 | 2.1 | <0.05 | <0.10 | <0.10 | 0.43 |
| BMMWN-2 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <0.10 | 1.6 | <0.05 | <0.10 | <0.10 | 0.38 |

11DCE = 1,1-dichloroethene
t12DCE = trans-1,2-dichloroethene
c12DCE = cis-1,2-dichloroethene
111TCA = 1,1,1-trichloroethane
TCE = trichloroethene
PCE = tetrachloroethene

MC = methylene chloride
11DCA = 1,1-dichloroethane
CF = chloroform
CT = carbon tetrachloride
112TCA = 1,1,2-trichloroethane

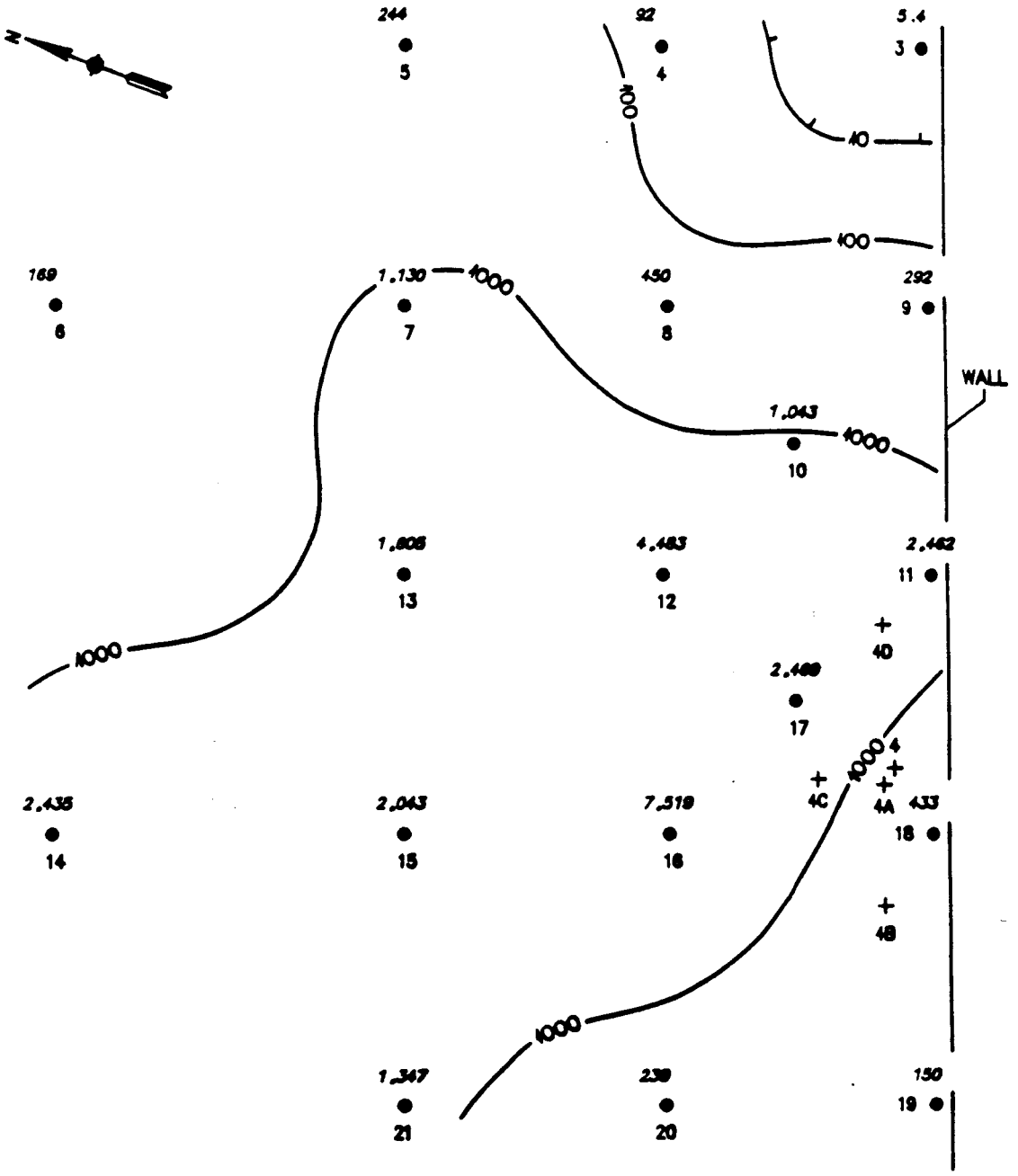


FIGURE 3. 1,1-dichloroethane (1,1-DCA) ($\mu g/l$)

WRIGHT ENVIRONMENTAL SERVICES, INC.

This map is integral to a written report and should be viewed in that context.

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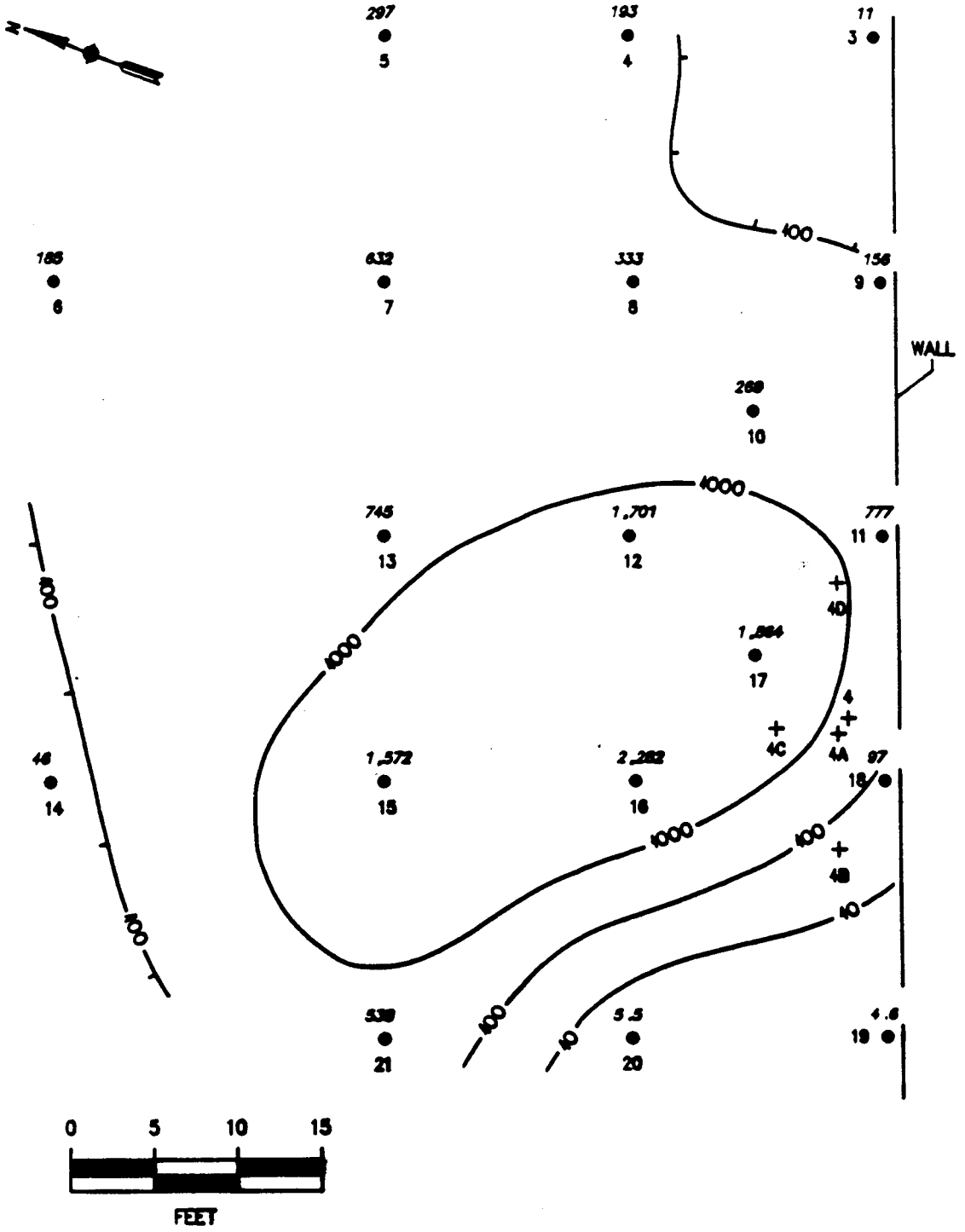


FIGURE 4. Tetrachloroethene (PCE) ($\mu g/l$)

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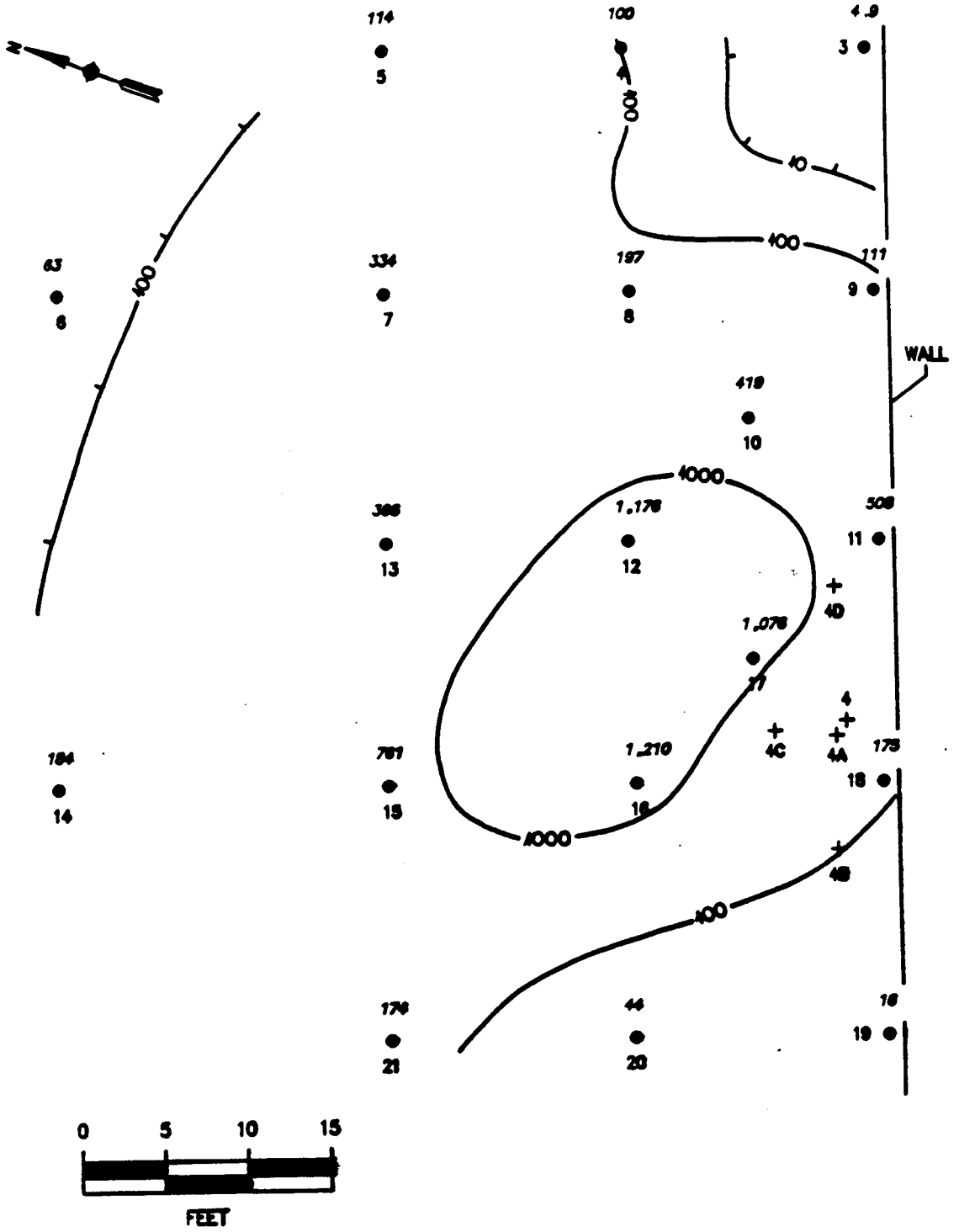


FIGURE 5. 1,1-dichloroethene (1,1-DCE) (µg/l)

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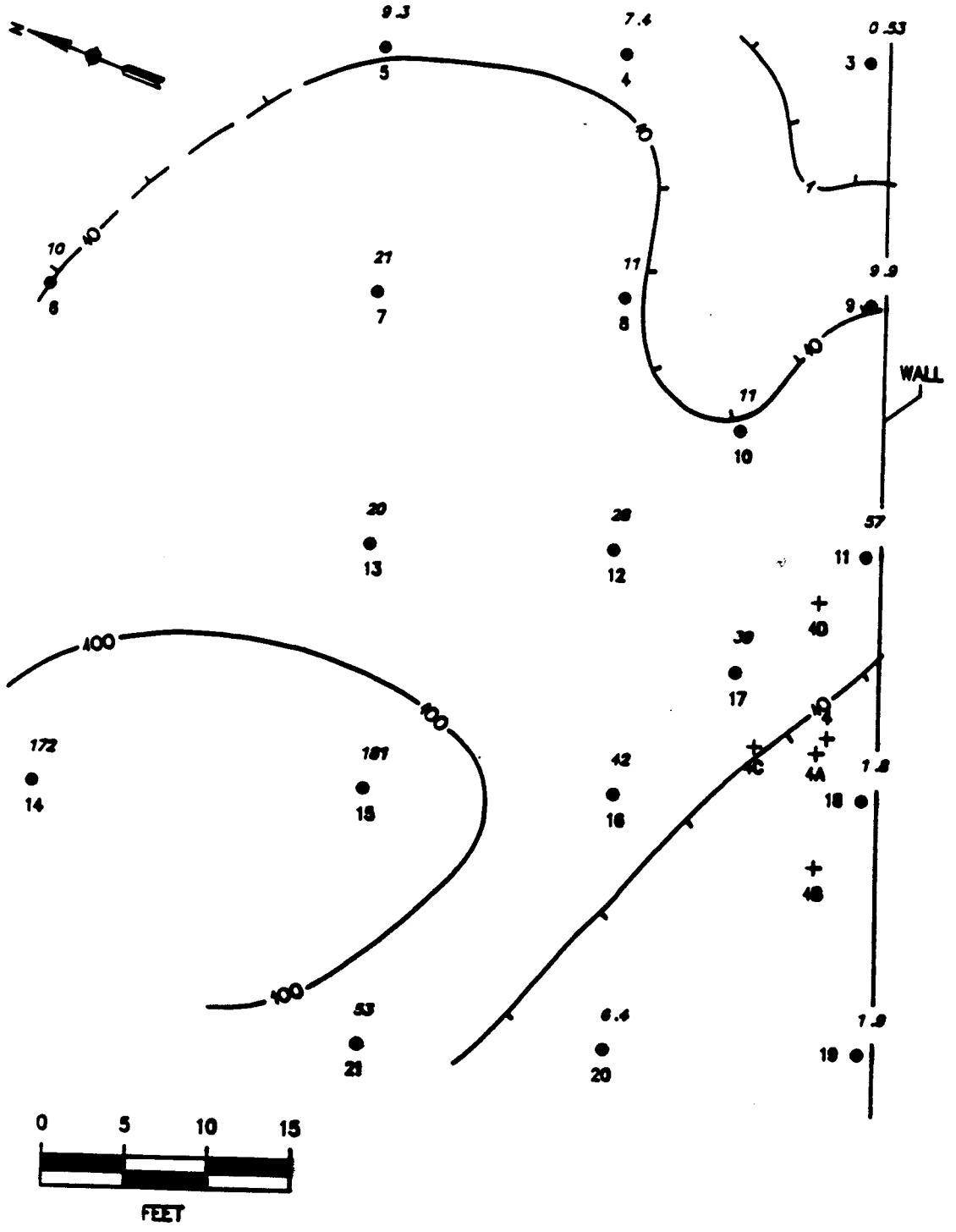


FIGURE 6. Trichloroethene (TCE) (µg/l)

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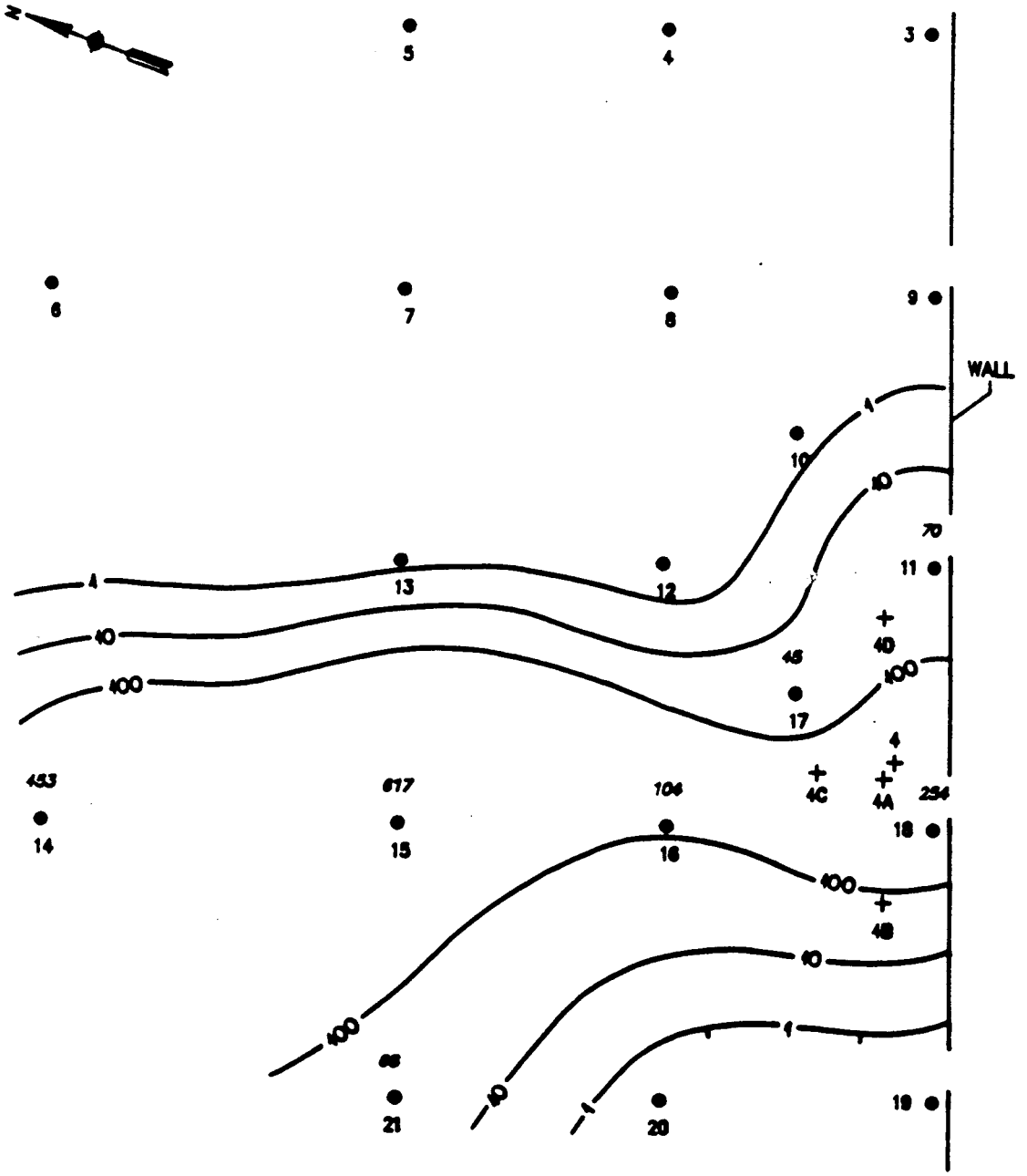


FIGURE 7. cis-1,2-dichloroethene (c-1,2-DCE) (µg/l)

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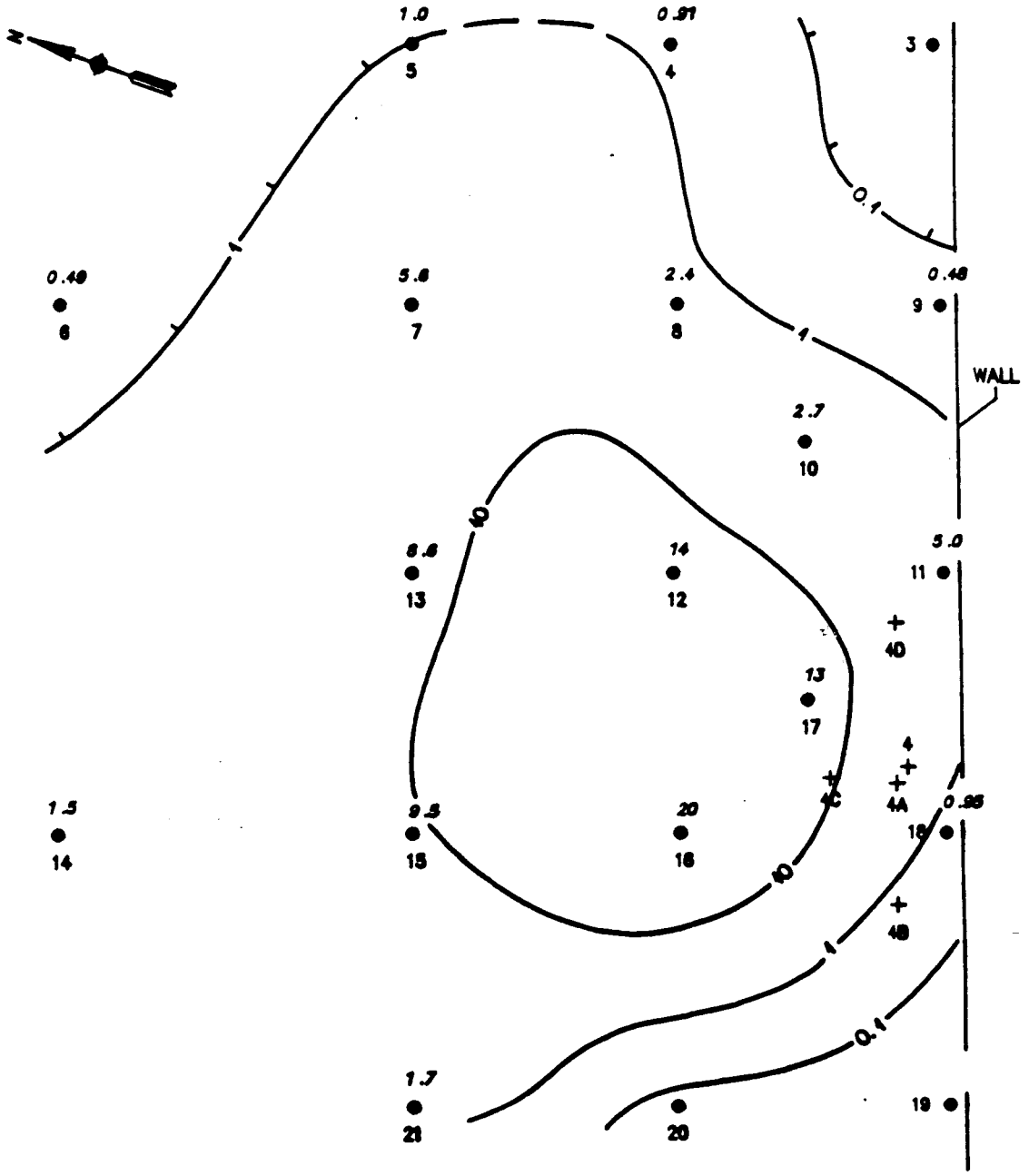


FIGURE 8. Chloroform ($\mu g/l$)

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