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APPENDIX D

SUMMARY REPORT ON HYDROGEOLOGIC INVESTIGATIONS, APRIL 1987

SUMMARY REPORT ON HYDROGEOLOGIC INVESTIGATIONS

OCCIDENTAL CHEMICAL CORPORATION
BURLINGTON, NEW JERSEY

Prepared For

Capehart & Scatchard, P. A.

April 1987

LEGGETTE, BRASHEARS & GRAHAM, INC.
Consulting Ground-Water Geologist
72 Danbury Road
Wilton, CT 06897

TABLE OF CONTENTS

	Page
INTRODUCTION.	1
BUSTLETON CREEK AS A HYDRAULIC BARRIER.	1
CONCLUSIONS	2
APPENDICES	

LIST OF FIGURES
(at end of report)

Figure	
1	Locations of Monitor Wells
2	Tidal Influence on Water Levels, Water Levels vs. Time in Bustleton Creek and Wells 6S, 6D, 7S and 7D
3	Tidal Influence on Water Levels, Water Levels vs. Time in Bustleton Creek and Wells 3S and 4S
4	Tidal Influence on Water Levels, Water Levels vs. Time in Bustleton Creek and Wells 3D and 4D
5	Tidal Influence on Water Levels, Water Levels vs. Time in Bustleton Creek and Wells 10 and 20

SUMMARY REPORT ON HYDROGEOLOGIC INVESTIGATIONS

OCCIDENTAL CHEMICAL CORPORATION BURLINGTON, NEW JERSEY

INTRODUCTION

In response to questions raised by the New Jersey Department of Environmental Protection (NJDEP), in conjunction with draft major modifications to the New Jersey Pollution Discharge Elimination System (NJPDES) permit for Occidental Chemical Corporation Burlington (North) to allow discharge to ground water, additional hydrogeologic investigations and evaluations of existing data have been made. In the following paragraphs these are discussed and conclusions drawn.

BUSTLETON CREEK AS A HYDRAULIC BARRIER

Very early in the ground-water investigation, Leggette, Brashears & Graham, Inc. (LBG) expressed the belief that Bustleton Creek is a hydraulic barrier. Because of the presence of volatile organic chemicals in early quarterly sampling of Monitor Wells 3S, 3D, 6S and 6D along the southern boundary of the site and because water levels in 3S and 3D indicate that there is a vertically downward component of ground-water flow at the site, some skepticism by the NJDEP regarding our earlier conclusion was expressed. Therefore, the NJDEP requested that monitor wells be installed south of the creek to determine whether or not the volatile organic chemicals had migrated across the presumed barrier. Information on vertical ground-water flow at the site is found in Appendix I and well locations with respect to Bustleton Creek are shown on figure 1.

A shallow well (7S) and a deep well (7D) were installed at the location shown on figure 1. These monitor wells are

similar in construction and depth intervals to 3S, 3D, 6S and 6D and monitor ground-water levels and ground-water quality in the same aquifer zones. Early sampling results indicate that Wells 7S and 7D are uncontaminated, which suggests that the creek is indeed a hydraulic barrier. Data on the installation of these wells is found in Appendix II.

In order to verify that the barrier, in fact, prevents movement of ground water south of the creek. Water-level measurements were made in selected monitor wells and in Bustleton Creek at the location shown on figure 1. The measurements were made during one day when one high and one low tide in both the stream and the wells were observed. The data are shown on the graphs in figures 2 through 5. It is readily apparent that ground-water levels are above the surface-water levels, that ground-water gradients are toward the creek on both sides and that Bustleton Creek is a hydraulic barrier. Therefore, based on the chemistry of ground water and the interrelationship between ground water and surface water observed at the site, Bustleton Creek effectively prevents the migration of ground water across its course in the vicinity of the Occidental Chemical Corporation facility. The ground water that will flow south from the plant will be captured by the stream, and significant volatilization and dilution will occur before discharge to the Delaware River. The stream constitutes a "line sink" which remediates any ground-water contamination concerns.

CONCLUSIONS

1. Bustleton Creek, south of the Occidental Chemical Corporation plant, is a hydraulic barrier which prevents the flow of ground water across its course.

2. As a hydraulic barrier, Bustleton Creek constitutes a line sink which captures ground-water flow moving southerly from the plant.

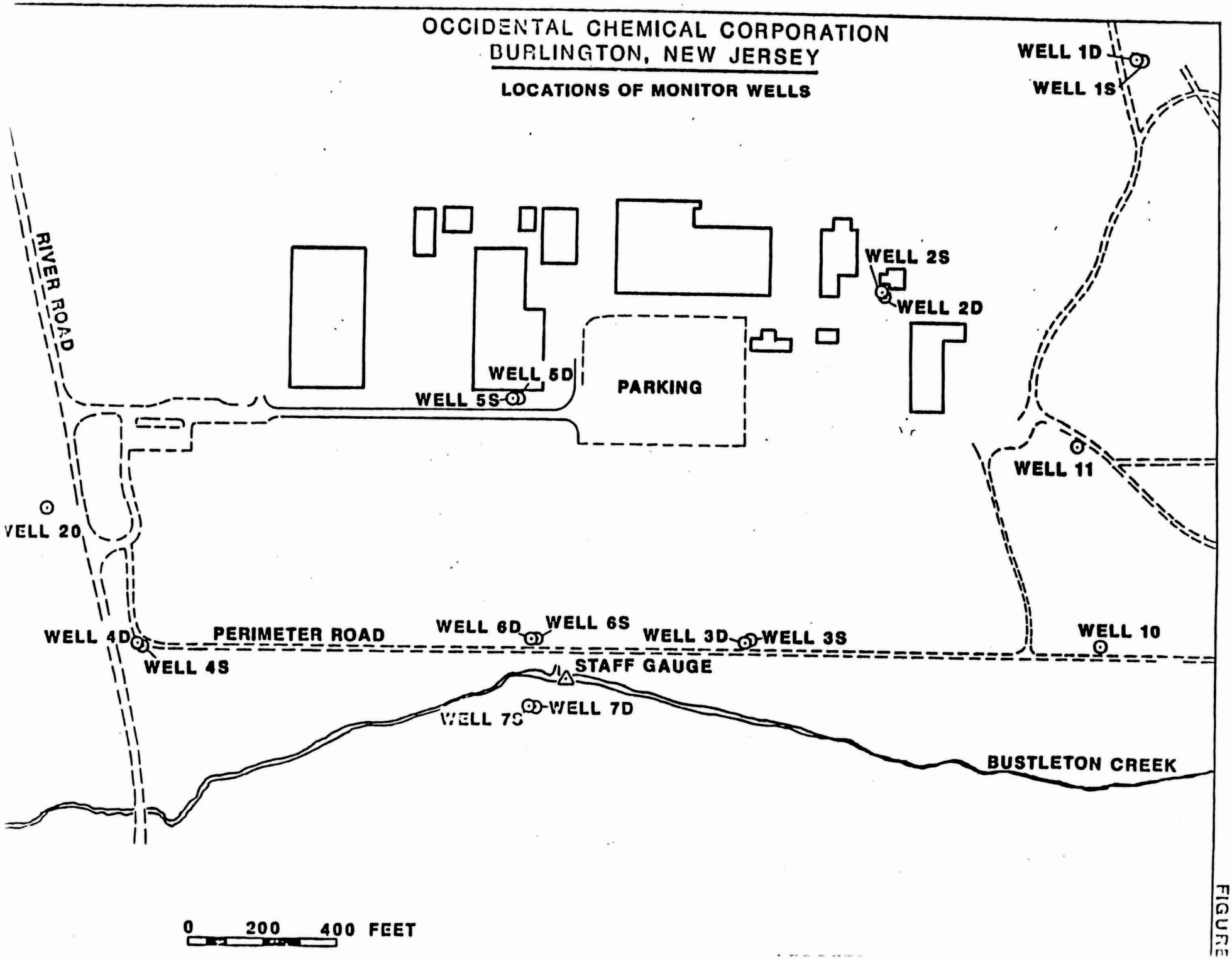
3. The impact of low levels of contamination in ground water from the plant is highly diluted by streamflow before discharge to the Delaware River. Likewise, substantial volatilization will occurr before discharge.

LEGGETTE, BRASHEARS & GRAHAM, INC.

G. Sidney Fox, CPG
Executive Vice President

bja
April 28, 1987
fox2

FIGURES


OCCIDENTAL CHEMICAL CORPORATION
BURLINGTON, NEW JERSEY
LOCATIONS OF MONITOR WELLS
WELL 1D
WELL 1S
WELL 2S
WELL 2D
RIVER ROAD
WELL 5D
WELL 5S
PARKING
WELL 11
VELL 20
WELL 4D
PERIMETER ROAD
WELL 6D
WELL 6S
WELL 3D
WELL 3S
WELL 10
WELL 4S
STAFF GAUGE
WELL 7S
WELL 7D
BUSTLETON CREEK
0 200 400 FEET

FIGURE

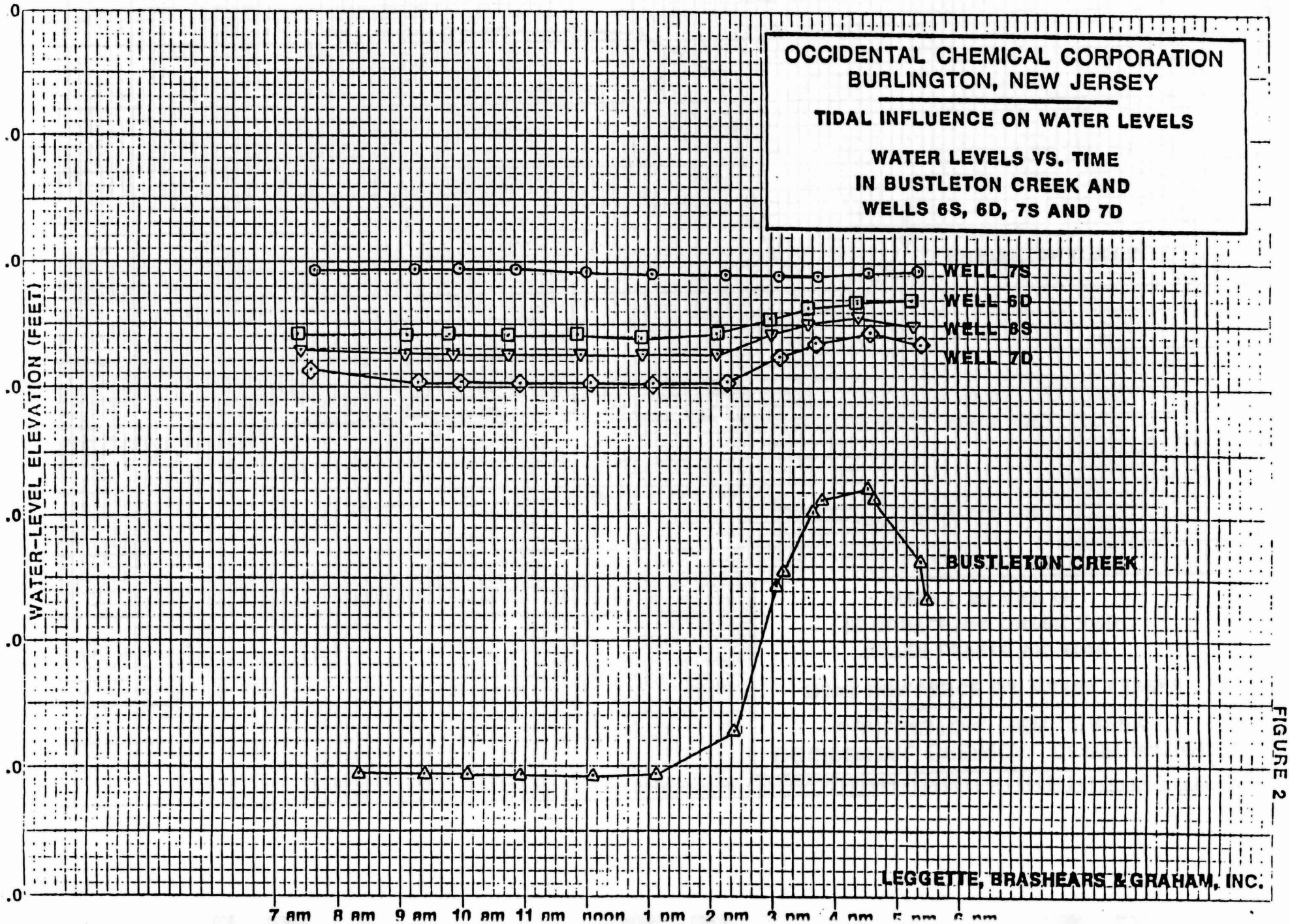

OCCIDENTAL CHEMICAL CORPORATION
BURLINGTON, NEW JERSEY
TIDAL INFLUENCE ON WATER LEVELS
WATER LEVELS VS. TIME
IN BUSTLETON CREEK AND
WELLS 6S, 6D, 7S AND 7D
WELL 7S
WELL 6D
WELL 6S
WELL 7D
BUSTLETON CREEK
WATER-LEVEL ELEVATION (FEET)
7 am
8 am
9 am
10 am
11 am
noon
1 pm
2 pm
3 pm
4 pm
5 pm
6 pm
LEGGETTE, BRASHEARS & GRAHAM, INC.

FIGURE 2

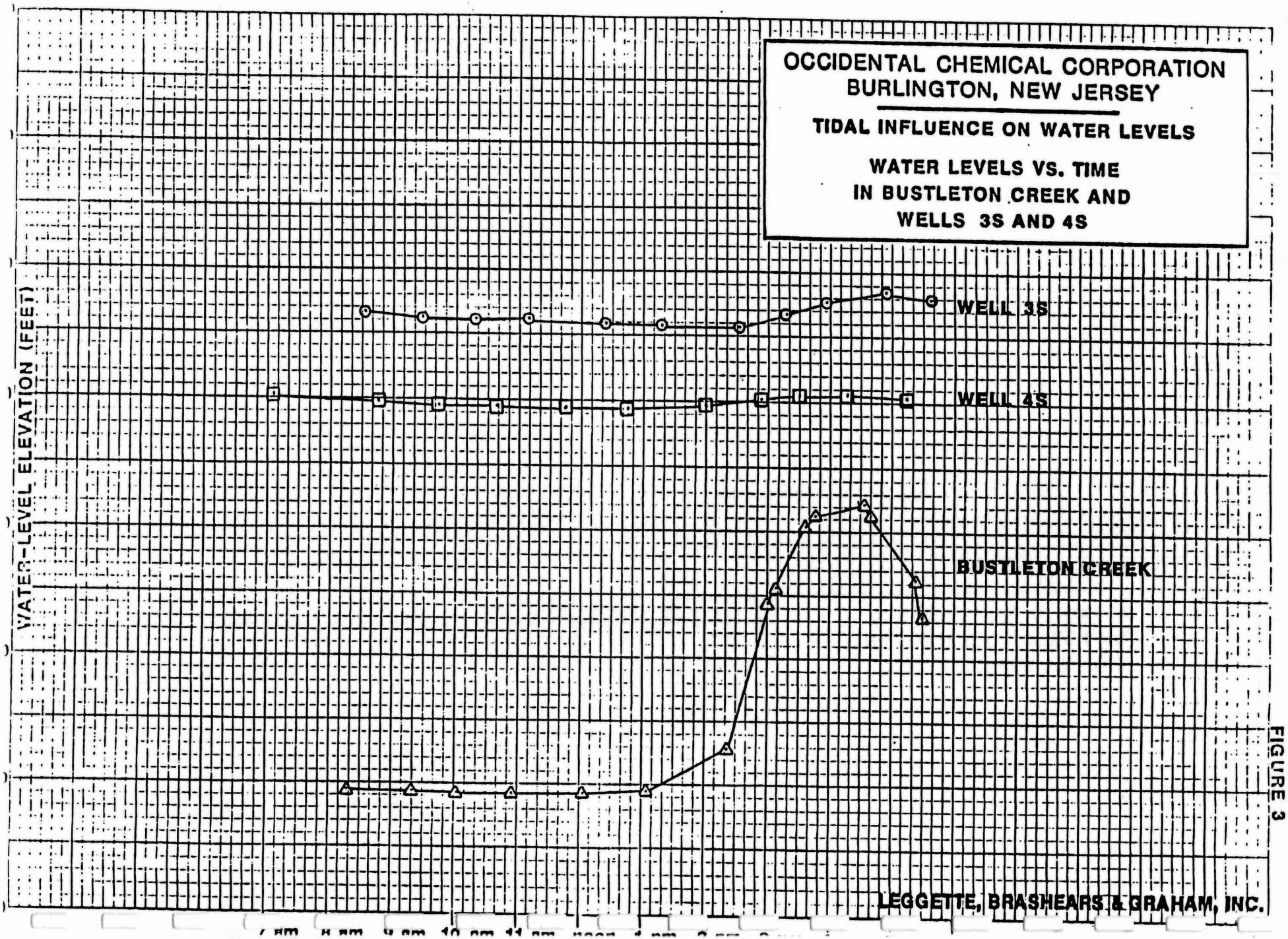

OCCIDENTAL CHEMICAL CORPORATION
BURLINGTON, NEW JERSEY
TIDAL INFLUENCE ON WATER LEVELS
WATER LEVELS VS. TIME
IN BUSTLETON CREEK AND
WELLS 3S AND 4S
WATER-LEVEL ELEVATION (FEET)
WELL 3S
WELL 4S
BUSTLETON CREEK
10 am
11 am
noon
LEGGETTE, BRASHEARS & GRAHAM, INC.

FIGURE 3

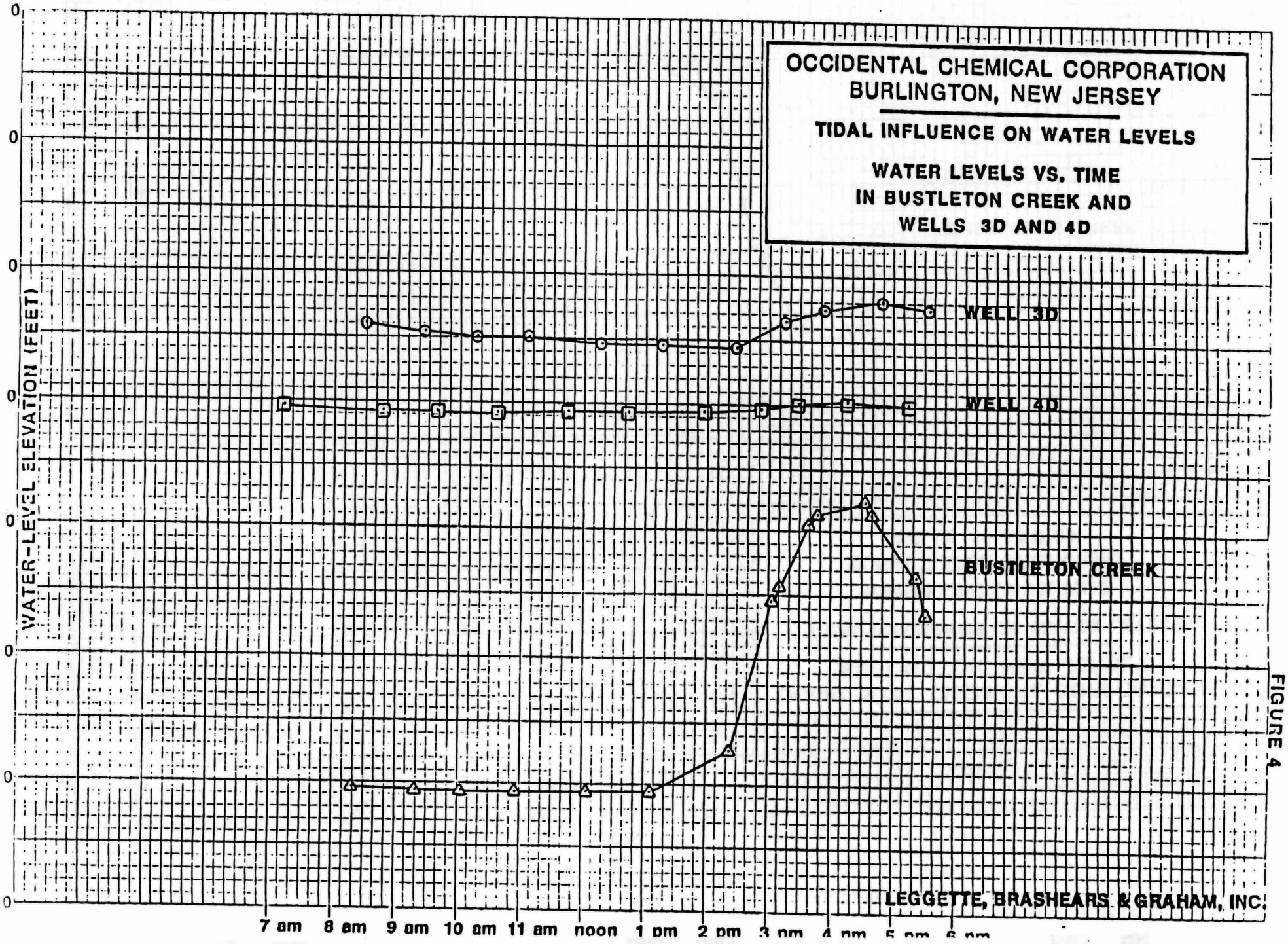
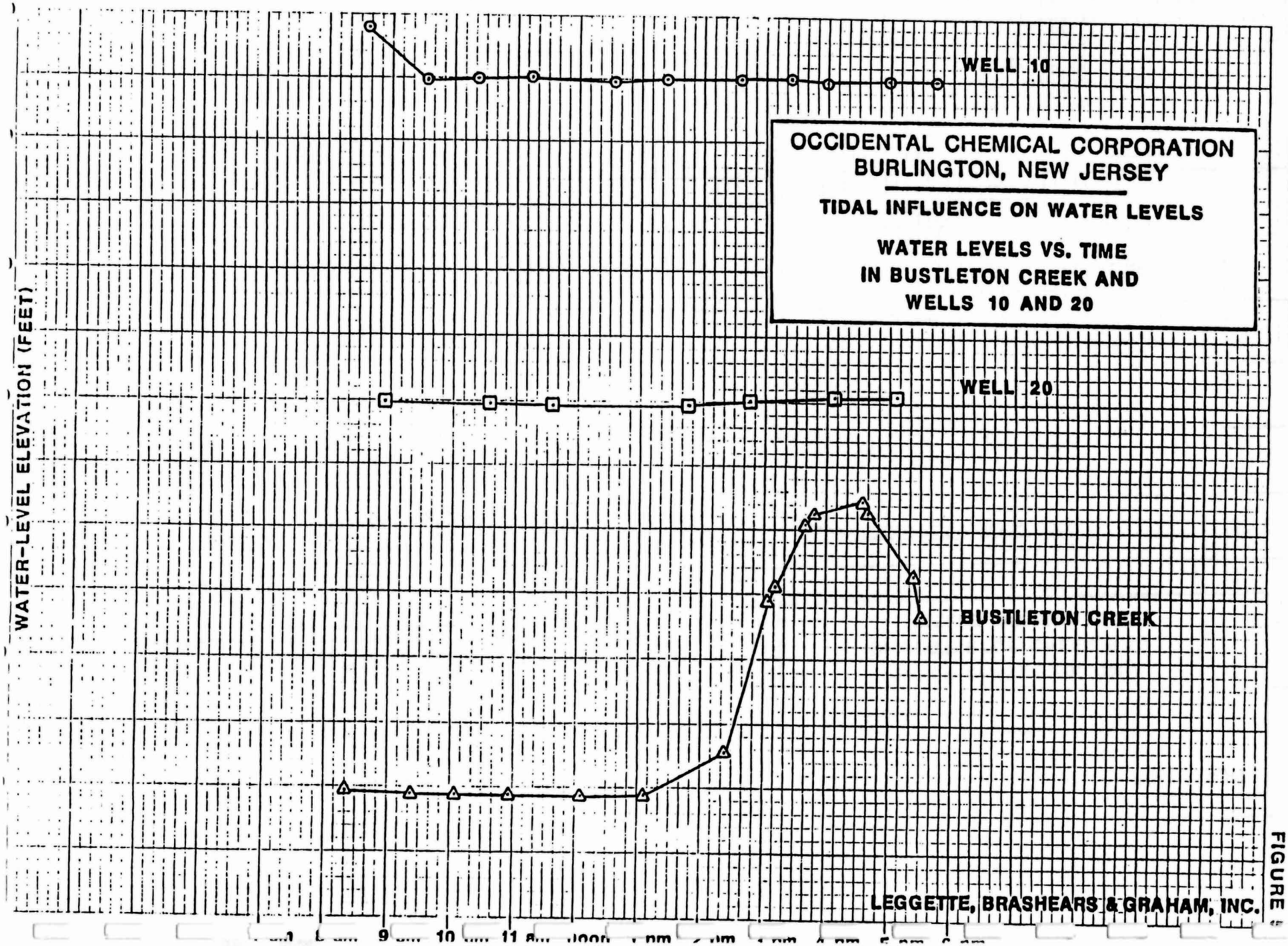

OCCIDENTAL CHEMICAL CORPORATION
BURLINGTON, NEW JERSEY
TIDAL INFLUENCE ON WATER LEVELS
WATER LEVELS VS. TIME
IN BUSTLETON CREEK AND
WELLS 3D AND 4D
WATER-LEVEL ELEVATION (FEET)
WELL 3D
WELL 4D
BUSTLETON CREEK
7 am
8 am
9 am
10 am
11 am
noon
1 pm
2 pm
3 pm
4 pm
5 pm
6 pm
LEGGETTE, BRASHEARS & GRAHAM, INC.

FIGURE 4



OCCIDENTAL CHEMICAL CORPORATION
BURLINGTON, NEW JERSEY

TIDAL INFLUENCE ON WATER LEVELS

WATER LEVELS VS. TIME
IN BUSTLETON CREEK AND
WELLS 10 AND 20

LEGGETTE, BRASHEARS & GRAHAM, INC.

FIGURE