
New Jersey Department of Environmental Protection
Division of Water Resources

FINAL REPORT

New Jersey Special Water Treatment Study
Phase II

May 1988



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DEP

TD
427
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S64a
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Camp Dresser & McKee Inc.
Edison, New Jersey

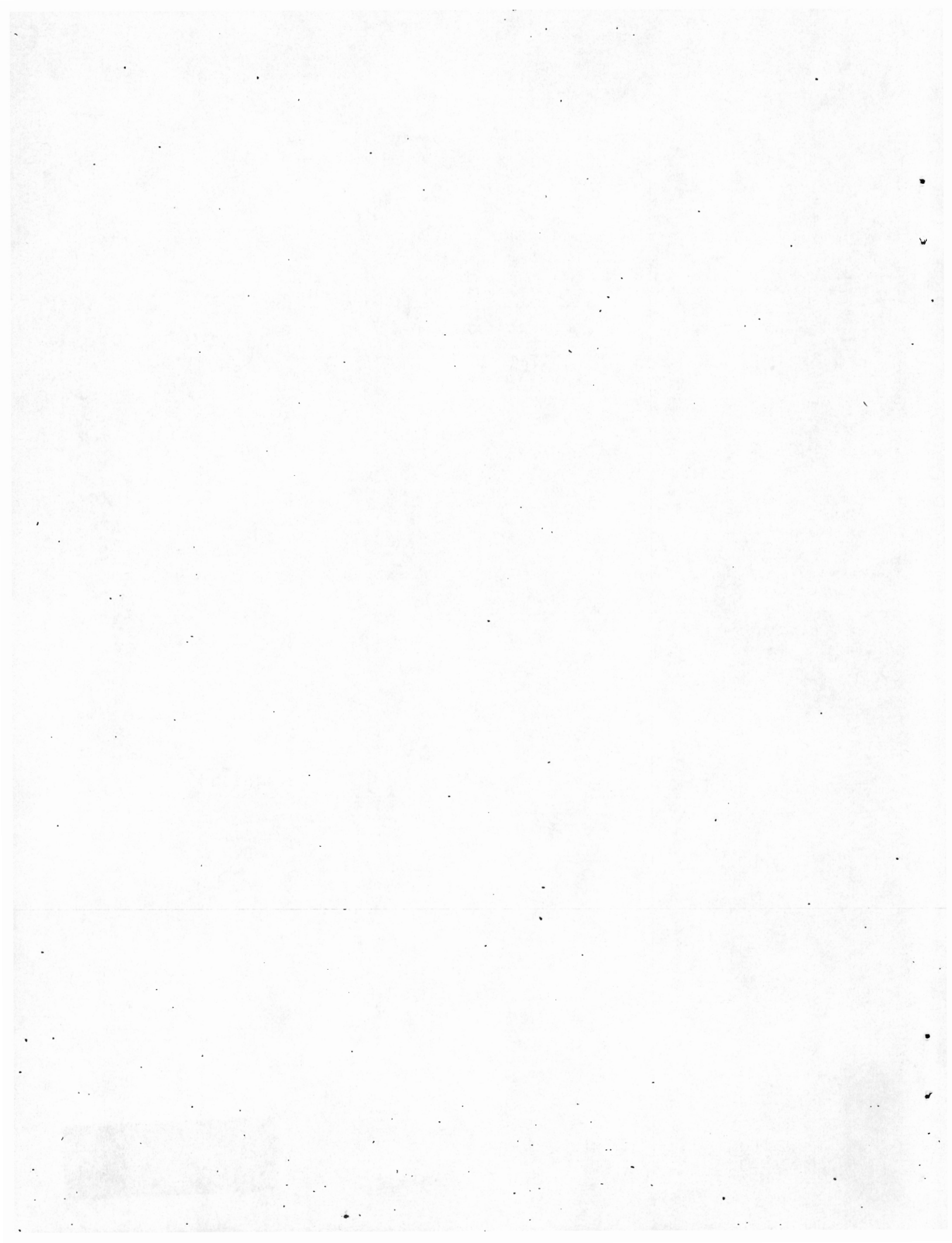
Speitel Associates
Biological Monitoring, Inc.

Appendix A

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TABLE A-1
CONCEPTUAL SIZINGS: AIR STRIPPING
COMPOUND OF INTEREST: Benzene

Henry's Law Constant (atm · m³/m³): 0.125
N.J. Interim Action Level I (mcg/l): 0 to 0.68

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Ht. = 18 ft Dia. = 2 ft A:W = 35:1	Ht. = 18 ft Dia. = 2 ft A:W = 35:1	Ht. = 18 ft Dia. = 6 ft A:W = 35:1	Ht. = 18 ft Dia. = 12 ft A:W = 35:1
50	Ht. = 30 ft Dia. = 2 ft A:W = 35:1	Ht. = 30 ft Dia. = 2 ft A:W = 35:1	Ht. = 30 ft Dia. = 6 ft A:W = 35:1	Ht. = 30 ft Dia. = 12 ft A:W = 35:1
100	Ht. = 34 ft Dia. = 2 ft A:W = 35:1	Ht. = 34 ft Dia. = 2 ft A:W = 35:1	Ht. = 34 ft Dia. = 6 ft A:W = 35:1	Ht. = 34 ft Dia. = 12 ft A:W = 35:1
1,000	Ht. = 52 ft Dia. = 2 ft A:W = 35:1	Ht. = 52 ft Dia. = 2 ft A:W = 35:1	Ht. = 52 ft Dia. = 6 ft A:W = 35:1	Ht. = 52 ft Dia. = 12 ft A:W = 35:1

NOTE: These sizings are informational only and are not intended for design purposes.

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TABLE A-2

CONCEPTUAL SIZINGS: AIR STRIPPING

COMPOUND OF INTEREST: Carbon Tetrachloride

Henry's Law Constant ($\text{atm} \cdot \text{m}^3/\text{m}^3$): 0.726
 N.J. Interim Action Level I (mcg/l): 0 to 0.27

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Ht. = 20 ft Dia. = 2 ft A:W = 25:1	Ht. = 20 ft Dia. = 2 ft A:W = 25:1	Ht. = 20 ft Dia. = 5 ft A:W = 25:1	Ht. = 20 ft Dia. = 12 ft A:W = 25:1
50	Ht. = 28 ft Dia. = 2 ft A:W = 25:1	Ht. = 28 ft Dia. = 2 ft A:W = 25:1	Ht. = 28 ft Dia. = 5 ft A:W = 25:1	Ht. = 28 ft Dia. = 12 ft A:W = 25:1
100	Ht. = 32 ft Dia. = 2 ft A:W = 25:1	Ht. = 32 ft Dia. = 2 ft A:W = 25:1	Ht. = 32 ft Dia. = 5 ft A:W = 25:1	Ht. = 32 ft Dia. = 12 ft A:W = 25:1
1,000	Ht. = 44 ft Dia. = 2 ft A:W = 25:1	Ht. = 44 ft Dia. = 2 ft A:W = 25:1	Ht. = 44 ft Dia. = 5 ft A:W = 25:1	Ht. = 44 ft Dia. = 12 ft A:W = 25:1

NOTE: These sizings are informational only and are not intended for design purposes.

TABLE A-3

CONCEPTUAL SIZINGS: AIR STRIPPING

COMPOUND OF INTEREST: Chlordane*

Henry's Law Constant ($\text{atm} \cdot \text{m}^3/\text{m}^3$): 0.004

N.J. Interim Action Level I (mcg/l): 0 to 0.8

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Ht. = 40 ft Dia. = 2 ft A:W = 575:1	Ht. = 40 ft Dia. = 5 ft A:W = 575:1	Ht. = 40 ft Dia. = 16 ft A:W = 575:1	Ht. = 40 ft Dia. = 36 ft A:W = 575:1
50	Ht. = 66 ft Dia. = 4 ft A:W = 615:1	Ht. = 66 ft Dia. = 5 ft A:W = 615:1	Ht. = 66 ft Dia. = 16 ft A:W = 615:1	Ht. = 66 ft Dia. = 36 ft A:W = 615:1
100	Ht. = 76 ft Dia. = 4 ft A:W = 620:1	Ht. = 76 ft Dia. = 5 ft A:W = 620:1	Ht. = 76 ft Dia. = 16 ft A:W = 620:1	Ht. = 76 ft Dia. = 36 ft A:W = 620:1
1,000	Ht. = 116 ft Dia. = 4 ft A:W = 624:1	Ht. = 116 ft Dia. = 5 ft A:W = 624:1	Ht. = 116 ft Dia. = 16 ft A:W = 624:1	Ht. = 116 ft Dia. = 36 ft A:W = 624:1

*It is not recommended that air stripping be used for removal of this compound. This table is included for illustrative purposes only.

NOTE: These sizings are informational only and are not intended for design purposes.

TABLE A-4

CONCEPTUAL SIZINGS: AIR STRIPPING

COMPOUND OF INTEREST: Dichlorobenzene

Henry's Law Constant ($\text{atm} \cdot \text{m}^3/\text{m}^3$): 0.092
 N.J. Interim Action Level I (mcg/l): 0 to 94.0

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
100	Ht. = 5 ft Dia. = 2 ft A:W = 25:1	Ht. = 5 ft Dia. = 2 ft A:W = 25:1	Ht. = 5 ft Dia. = 5 ft A:W = 25:1	Ht. = 5 ft Dia. = 12 ft A:W = 25:1
500	Ht. = 5 ft Dia. = 2 ft A:W = 30:1	Ht. = 5 ft Dia. = 2 ft A:W = 30:1	Ht. = 5 ft Dia. = 5 ft A:W = 30:1	Ht. = 5 ft Dia. = 12 ft A:W = 40:1
1,000	Ht. = 18 ft Dia. = 2 ft A:W = 40:1	Ht. = 18 ft Dia. = 2 ft A:W = 40:1	Ht. = 28 ft Dia. = 5 ft A:W = 40:1	Ht. = 28 ft Dia. = 12 ft A:W = 40:1
5000	Ht. = 32 ft Dia. = 2 ft A:W = 40:1	Ht. = 32 ft Dia. = 2 ft A:W = 40:1	Ht. = 32 ft Dia. = 5 ft A:W = 40:1	Ht. = 32 ft Dia. = 12 ft A:W = 40:1

NOTE: These sizings are informational only and are not intended for design purposes.

TABLE A-5

CONCEPTUAL SIZINGS: AIR STRIPPING

COMPOUND OF INTEREST: 1,2-Dichloroethane

Henry's Law Constant ($\text{atm} \cdot \text{m}^3/\text{m}^3$): 0.035

N.J. Interim Action Level I (mcg/l): 0 to 0.7

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Ht. = 20 ft Dia. = 2 ft A:W = 95:1	Ht. = 20 ft Dia. = 3 ft A:W = 95:1	Ht. = 20 ft Dia. = 8 ft A:W = 95:1	Ht. = 20 ft Dia. = 18 ft A:W = 95:1
5	Ht. = 30 ft Dia. = 2 ft A:W = 100:1	Ht. = 30 ft Dia. = 3 ft A:W = 100:1	Ht. = 30 ft Dia. = 8 ft A:W = 100:1	Ht. = 30 ft Dia. = 18 ft A:W = 100:1
100	Ht. = 36 ft Dia. = 2 ft A:W = 100:1	Ht. = 36 ft Dia. = 2 ft A:W = 100:1	Ht. = 36 ft Dia. = 8 ft A:W = 100:1	Ht. = 36 ft Dia. = 18 ft A:W = 100:1
1,000	Ht. = 54 ft Dia. = 2 ft A:W = 100:1	Ht. = 54 ft Dia. = 3 ft A:W = 100:1	Ht. = 54 ft Dia. = 8 ft A:W = 100:1	Ht. = 54 ft Dia. = 18 ft A:W = 100:1

NOTE: These sizings are informational only and are not intended for design purposes..

TABLE A-6

CONCEPTUAL SIZINGS: AIR STRIPPING

COMPOUND OF INTEREST: 1,1-Dichloroethylene

Henry's Law Constant ($\text{atm} \cdot \text{m}^3/\text{m}^3$): 0.738
 N.J. Interim Action Level I (mcg/l): 0 to 7.0

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Ht. = 5 ft Dia. = 2 ft A:W = 25:1	Ht. = 5 ft Dia. = 2 ft A:W = 25:1	Ht. = 5 ft Dia. = 5 ft A:W = 25:1	Ht. = 5 ft Dia. = 12 ft A:W = 25:1
50	Ht. = 10 ft Dia. = 2 ft A:W = 25:1	Ht. = 10 ft Dia. = 2 ft A:W = 25:1	Ht. = 10 ft Dia. = 5 ft A:W = 25:1	Ht. = 10 ft Dia. = 12 ft A:W = 25:1
100	Ht. = 14 ft Dia. = 2 ft A:W = 25:1	Ht. = 14 ft Dia. = 2 ft A:W = 25:1	Ht. = 14 ft Dia. = 5 ft A:W = 25:1	Ht. = 14 ft Dia. = 12 ft A:W = 25:1
1,000	Ht. = 26 ft Dia. = 2 ft A:W = 25:1	Ht. = 26 ft Dia. = 2 ft A:W = 25:1	Ht. = 26 ft Dia. = 5 ft A:W = 125:1	Ht. = 26 ft Dia. = 12 ft A:W = 25:1

NOTE: These sizings are informational only and are not intended for design purposes.

TABLE A-7

CONCEPTUAL SIZINGS: AIR STRIPPING

COMPOUND OF INTEREST: Trans-1,2-Dichloroethylene

Henry's Law Constant ($\text{atm} \cdot \text{m}^3/\text{m}^3$): 0.281
 N.J. Interim Action Level I (mcg/l): 0 to 27.0

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
50	Ht. = 5 ft Dia. = 2 ft A:W = 25:1	Ht. = 5 ft Dia. = 2 ft A:W = 25:1	Ht. = 5 ft Dia. = 5 ft A:W = 25:1	Ht. = 5 ft Dia. = 12 ft A:W = 25:1
100	Ht. = 7 ft Dia. = 2 ft A:W = 25:1	Ht. = 7 ft Dia. = 2 ft A:W = 25:1	Ht. = 7 ft Dia. = 5 ft A:W = 25:1	Ht. = 7 ft Dia. = 12 ft A:W = 25:1
1,000	Ht. = 18 ft Dia. = 2 ft A:W = 25:1	Ht. = 18 ft Dia. = 2 ft A:W = 25:1	Ht. = 18 ft Dia. = 5 ft A:W = 25:1	Ht. = 18 ft Dia. = 12 ft A:W = 25:1
5,000	Ht. = 26 ft Dia. = 2 ft A:W = 25:1	Ht. = 26 ft Dia. = 2 ft A:W = 25:1	Ht. = 26 ft Dia. = 5 ft A:W = 25:1	Ht. = 26 ft Dia. = 12 ft A:W = 25:1

NOTE: These sizings are informational only and are not intended for design purposes.

TABLE A-8

CONCEPTUAL SIZINGS: AIR STRIPPING

COMPOUND OF INTEREST: Methylene Chloride

Henry's Law Constant ($\text{atm} \cdot \text{m}^3/\text{m}^3$): 0.058
 N.J. Interim Action Level I (mcg/l): 0 to 4.8

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Ht. = 6 ft Dia. = 2 ft A:W = 40:1	Ht. = 6 ft Dia. = 2 ft A:W = 40:1	Ht. = 6 ft Dia. = 6 ft A:W = 40:1	Ht. = 6 ft Dia. = 12 ft A:W = 40:1
50	Ht. = 16 ft Dia. = 2 ft A:W = 50:1	Ht. = 16 ft Dia. = 2 ft A:W = 50:1	Ht. = 16 ft Dia. = 6 ft A:W = 50:1	Ht. = 16 ft Dia. = 12 ft A:W = 50:1
100	Ht. = 20 ft Dia. = 2 ft A:W = 55:1	Ht. = 20 ft Dia. = 2 ft A:W = 55:1	Ht. = 20 ft Dia. = 6 ft A:W = 55:1	Ht. = 20 ft Dia. = 12 ft A:W = 55.1
1,000	Ht. = 36 ft Dia. = 2 ft A:W = 55:1	Ht. = 36 ft Dia. = 2 ft A:W = 55:1	Ht. = 36 ft Dia. = 6 ft A:W = 55:1	Ht. = 36 ft Dia. = 12 ft A:W = 55:1

NOTE: These sizings are informational only and are not intended for design purposes.

TABLE A-9

CONCEPTUAL SIZINGS: AIR STRIPPING

COMPOUND OF INTEREST: PCBs*

Henry's Law Constant (atm · m³/m³): 0.024
 N.J. Interim Action Level I (mcg/l): 0 to 0.68

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Ht. = 82 ft Dia. = 2 ft A:W = 125:1	Ht. = 82 ft Dia. = 3 ft A:W = 125:1	Ht. = 82 ft Dia. = 9 ft A:W = 125:1	Ht. = 82 ft Dia. = 20 ft A:W = 125:1
50	Ht. = 100 ft Dia. = 2 ft A:W = 125:1	Ht. = 100 ft Dia. = 3 ft A:W = 125:1	Ht. = 100 ft Dia. = 9 ft A:W = 125:1	Ht. = 100 ft Dia. = 20 ft A:W = 125:1
100	Ht. = 108 ft Dia. = 2 ft A:W = 125:1	Ht. = 108 ft Dia. = 3 ft A:W = 125:1	Ht. = 108 ft Dia. = 9 ft A:W = 125:1	Ht. = 108 ft Dia. = 20 ft A:W = 125:1
1,000	Ht. = 136 ft Dia. = 2 ft A:W = 125:1	Ht. = 136 ft Dia. = 3 ft A:W = 125:1	Ht. = 136 ft Dia. = 9 ft A:W = 125:1	Ht. = 136 ft Dia. = 20 ft A:W = 125:1

*It is not recommended that air stripping be used for removal of this compound. This table is included for illustrative purposes only.

NOTE: These sizings are informational only and are not intended for design purposes.

TABLE A-10

CONCEPTUAL SIZINGS: AIR STRIPPING

COMPOUND OF INTEREST: Tetrachloroethylene

Henry's Law Constant ($\text{atm} \cdot \text{m}^3/\text{m}^3$): 0.295
 N.J. Interim Action Level I (mcg/l): 0 to 0.67

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Ht. = 18 ft	Ht. = 18 ft	Ht. = 18 ft	Ht. = 18 ft
	Dia. = 2 ft	Dia. = 2 ft	Dia. = 5 ft	Dia. = 12 ft
	A:W = 25:1	A:W = 25:1	A:W = 25:1	A:W = 25:1
50	Ht. = 28 ft	Ht. = 28 ft	Ht. = 28 ft	Ht. = 28 ft
	Dia. = 2 ft	Dia. = 2 ft	Dia. = 5 ft	Dia. = 12 ft
	A:W = 25:1	A:W = 25:1	A:W = 25:1	A:W = 25:1
100	Ht. = 32 ft	Ht. = 32 ft	Ht. = 32 ft	Ht. = 32 ft
	Dia. = 2 ft	Dia. = 2 ft	Dia. = 5 ft	Dia. = 12 ft
	A:W = 25:1	A:W = 25:1	A:W = 25:1	A:W = 25:1
1,000	Ht. = 46 ft	Ht. = 46 ft	Ht. = 46 ft	Ht. = 46 ft
	Dia. = 2 ft	Dia. = 2 ft	Dia. = 5 ft	Dia. = 12 ft
	A:W = 25:1	A:W = 25:1	A:W = 25:1	A:W = 25:1

NOTE: These sizings are informational only and are not intended for design purposes.

TABLE A-11

CONCEPTUAL SIZINGS: AIR STRIPPING

COMPOUND OF INTEREST: 1,1,1-Trichloroethane

Henry's Law Constant (atm · m³/m³): 0.190
 N.J. Interim Action Level I (mcg/l): 0 to 20.0

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
50	Ht. = 6 ft Dia. = 2 ft A:W = 25:1	Ht. = 6 ft Dia. = 2 ft A:W = 25:1	Ht. = 6 ft Dia. = 5 ft A:W = 25:1	Ht. = 6 ft Dia. = 12 ft A:W = 25:1
100	Ht. = 10 ft Dia. = 2 ft A:W = 25:1	Ht. = 10 ft Dia. = 2 ft A:W = 25:1	Ht. = 10 ft Dia. = 5 ft A:W = 25:1	Ht. = 10 ft Dia. = 12 ft A:W = 25:1
1,000	Ht. = 26 ft Dia. = 2 ft A:W = 25:1	Ht. = 26 ft Dia. = 2 ft A:W = 25:1	Ht. = 26 ft Dia. = 2 ft A:W = 25:1	Ht. = 26 ft Dia. = 12 ft A:W = 25:1

NOTE: These sizings are informational only and are not intended for design purposes.

TABLE A-12

CONCEPTUAL SIZINGS: AIR STRIPPING

COMPOUND OF INTEREST: Trichloroethylene

Henry's Law Constant ($\text{atm} \cdot \text{m}^3/\text{m}^3$): 0.140
 N.J. Interim Action Level I (mcg/l): 0 to 3.1

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Ht. = 10 ft Dia. = 2 ft A:W = 30:1	Ht. = 10 ft Dia. = 2 ft A:W = 30:1	Ht. = 10 ft Dia. = 5 ft A:W = 30:1	Ht. = 10 ft Dia. = 12 ft A:W = 30:1
50	Ht. = 22 ft Dia. = 2 ft A:W = 30:1	Ht. = 22 ft Dia. = 2 ft A:W = 30:1	Ht. = 22 ft Dia. = 5 ft A:W = 30:1	Ht. = 22 ft Dia. = 12 ft A:W = 30:1
100	Ht. = 24 ft Dia. = 2 ft A:W = 35:1	Ht. = 24 ft Dia. = 2 ft A:W = 35:1	Ht. = 24 ft Dia. = 5 ft A:W = 35:1	Ht. = 24 ft Dia. = 12 ft A:W = 35:1
1,000	Ht. = 42 ft Dia. = 4 ft A:W = 35:1	Ht. = 42 ft Dia. = 5 ft A:W = 35:1	Ht. = 42 ft Dia. = 5 ft A:W = 35:1	Ht. = 42 ft Dia. = 12 ft A:W = 35:1

NOTE: These sizings are informational only and are not intended for design purposes.

TABLE A-13

CONCEPTUAL SIZINGS: AIR STRIPPING

COMPOUND OF INTEREST: Vinyl Chloride

Henry's Law Constant ($\text{atm} \cdot \text{m}^3/\text{m}^3$): 0.506
 N.J. Interim Action Level I (mcg/l): 0 to 0.015

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Ht. = 32 ft Dia. = 2 ft A:W = 25:1	Ht. = 32 ft Dia. = 2 ft A:W = 25:1	Ht. = 32 ft Dia. = 5 ft A:W = 25:1	Ht. = 32 ft Dia. = 12 ft A:W = 25:1
50	Ht. = 40 ft Dia. = 2 ft A:W = 25:1	Ht. = 40 ft Dia. = 2 ft A:W = 25:1	Ht. = 40 ft Dia. = 5 ft A:W = 25:1	Ht. = 40 ft Dia. = 12 ft A:W = 25:1
100	Ht. = 44 ft Dia. = 2 ft A:W = 25:1	Ht. = 44 ft Dia. = 2 ft A:W = 25:1	Ht. = 44 ft Dia. = 5 ft A:W = 25:1	Ht. = 44 ft Dia. = 12 ft A:W = 25:1
1,000	Ht. = 54 ft Dia. = 2 ft A:W = 25:1	Ht. = 54 ft Dia. = 2 ft A:W = 25:1	Ht. = 54 ft Dia. = 5 ft A:W = 25:1	Ht. = 54 ft Dia. = 12 ft A:W = 25:1

NOTE: These sizings are informational only and are not intended for design purposes.

TABLE A-14

CONCEPTUAL SIZINGS: AIR STRIPPING

COMPOUND OF INTEREST: Xylenes

Henry's Law Constant ($\text{atm} \cdot \text{m}^3/\text{m}^3$): 0.140
 N.J. Interim Action Level I (mcg/l): 0 to 100

Water concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
200	Ht. = 6 ft Dia. = 2 ft A:W = 25:1	Ht. = 6 ft Dia. = 2 ft A:W = 25:1	Ht. = 6 ft Dia. = 5 ft A:W = 25:1	Ht. = 6 ft Dia. = 12 ft A:W = 25:1
500	Ht. = 12 ft Dia. = 2 ft A:W = 30:1	Ht. = 12 ft Dia. = 2 ft A:W = 30:1	Ht. = 12 ft Dia. = 5 ft A:W = 30:1	Ht. = 12 ft Dia. = 12 ft A:W = 30:1
1,000	Ht. = 18 ft Dia. = 2 ft A:W = 30:1	Ht. = 18 ft Dia. = 2 ft A:W = 30:1	Ht. = 18 ft Dia. = 5 ft A:W = 30:1	Ht. = 18 ft Dia. = 12 ft A:W = 30:1
2,000	Ht. = 24 ft Dia. = 2 ft A:W = 30:1	Ht. = 24 ft Dia. = 2 ft A:W = 30:1	Ht. = 24 ft Dia. = 5 ft A:W = 30:1	Ht. = 24 ft Dia. = 12 ft A:W = 30:1

NOTE: These sizings are informational only and are not intended for design purposes.

Appendix B

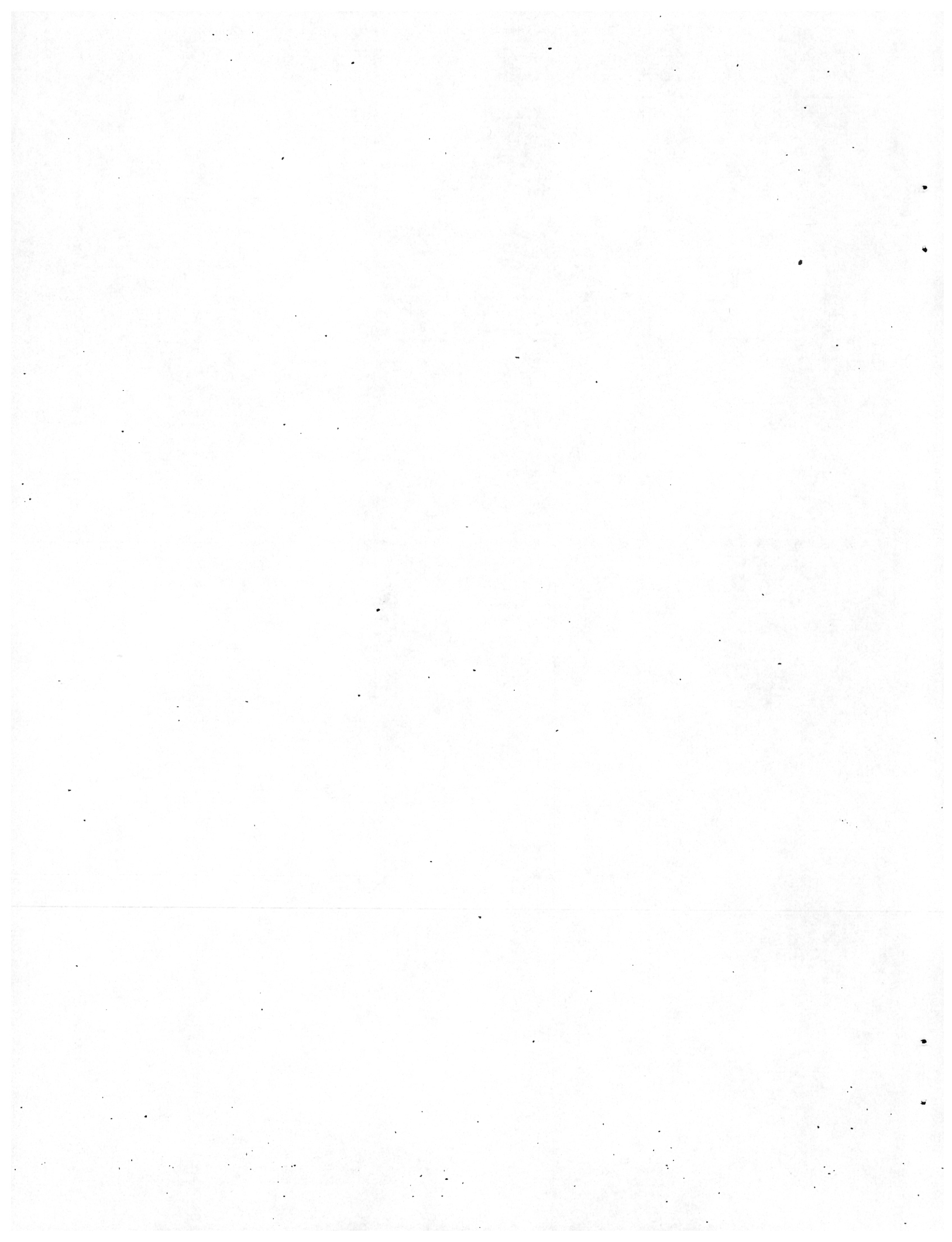


TABLE B-1

CONCEPTUAL SIZINGS: CARBON ADSORPTION

COMPOUND OF INTEREST: Benzene

Freundlich Parameters: $K(\text{mg/g}) = 26$ $1/n$ (dimensionless) = .41
 N.J. Interim Action Level I (mcg/l): 0 to 0.68
 Factor of Safety = 4

Water Concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Amt. = 4,000 lbs Life = 11 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 8 months EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 60,000 lbs Life = 8 months EBCT = 24 mins Vol. = 2,222 cu.ft.	Amt. = 260,000 lbs Life = 7 months EBCT = 21 mins. Vol. = 9,630 cu.ft.
50	Amt. = 4,000 lbs Life = 2 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 2 months EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 120,000 lbs Life = 3 months EBCT = 48 mins. Vol. = 4,444 cu.ft.	Amt. = 600,000 lbs Life = 3 months EBCT = 48 mins. Vol. = 22,222 cu.ft.
100	Amt. = 4,000 lbs Life = 1 month EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 8,000 Life = 1 month EBCT = 32 mins. Vol. = 296 cu.ft.		

NOTES: These sizings are informational only and are not intended for design purpose.

The above GAC bed lives are computed, theoretical values. As a practical matter disregard any life in excess of 18 months, because GAC should generally be replaced after this period of service due to bed softening and erosion.

TABLE B-2

CONCEPTUAL SIZINGS: CARBON ADSORPTION

COMPOUND OF INTEREST: Carbon Tetrachloride

Freundlich Parameters: $K(\text{mg/g}) = 30$ $1/n$ (dimensionless) = 0.63
 N.J. Interim Action Level I (mcg/l): 0 to 0.27
 Factor of Safety = 4

Water Concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Amt. = 4,000 lbs Life = 1 month EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 1 month EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 180,000 lbs Life = 3 months EBCT = 72 mins. Vol. = 6,667 cu.ft.	Amt. = 860,000 lbs Life = 3 months EBCT = 69 mins. Vol. = 31,852 cu.ft.

NOTES: These sizings are informational only and are not intended for design purpose.

The above GAC bed lives are computed, theoretical values. As a practical matter disregard any life in excess of 18 months, because GAC should generally be replaced after this period of service due to bed softening and erosion.

TABLE B-3

CONCEPTUAL SIZINGS: CARBON ADSORPTION

COMPOUND OF INTEREST: Chlordane

Freundlich Parameters: $K(\text{mg/g}) = 245$ $1/n$ (dimensionless) = 0.38
 N.J. Interim Action Level I (mcg/l): 0 to 0.80
 Factor of Safety = 4

Water Concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Amt. = 2,000 lbs Life = 69 months EBCT = 16 mins. Vol. = 74 cu.ft.	Amt. = 4,000 lbs Life = 69 months EBCT = 16 mins. Vol. = 148 cu.ft.	Amt. = 40,000 lbs Life = 69 months EBCT = 16 mins. Vol. = 1,481 cu.ft.	Amt. = 200,000 lbs Life = 69 months EBCT = 16 mins. Vol. = 7,407 cu.ft.
50	Amt. = 2,000 lbs Life = 13 months EBCT = 16 mins. Vol. = 74 cu.ft.	Amt. = 4,000 lbs Life = 13 months EBCT = 16 mins. Vol. = 148 cu.ft.	Amt. = 40,000 lbs Life = 13 months EBCT = 16 mins. Vol. = 1,481 cu.ft.	Amt. = 200,000 lbs Life = 13 months EBCT = 16 mins. Vol. = 7,407 cu.ft.
100	Amt. = 2,000 lbs Life = 6 months EBCT = 16 mins. Vol. = 74 cu.ft.	Amt. = 4,000 lbs Life = 6 months EBCT = 16 mins. Vol. = 148 cu.ft.	Amt. = 40,000 lbs Life = 6 months EBCT = 16 mins. Vol. = 1,481 cu.ft.	Amt. = 200,000 lbs Life = 6 months EBCT = 16 mins. Vol. = 7,407 cu.ft.
1,000	Amt. = 4,000 lbs Life = 1 month EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 1 month EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 200,000 lbs Life = 3 months EBCT = 80 mins. Vol. = 7,407 cu.ft.	Amt. = 920,000 lbs Life = 3 months EBCT = 73 mins. Vol. = 34,074 cu.ft.

NOTES: These sizings are informational only and are not intended for design purpose.

The above GAC bed lives are computed, theoretical values. As a practical matter disregard any life in excess of 18 months, because GAC should generally be replaced after this period of service due to bed softening and erosion.

TABLE B-4

CONCEPTUAL SIZINGS: CARBON ADSORPTION

COMPOUND OF INTEREST: 1,3-Dichlorobenzene

Freundlich Parameters: $K(\text{mg/g}) = 118$ $1/n$ (dimensionless) = 0.45
 N.J. Interim Action Level I (mcg/l): 0 to 94.0
 Factor of Safety = 4

Water Concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
100	Amt. = 4,000 lbs Life = 525 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 394 months EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 60,000 lbs Life = 394 months EBCT = 24 mins. Vol. = 2,222 cu.ft.	Amt. = 260,000 lbs Life = 341 months EBCT = 21 mins. Vol. = 9,630 cu.ft.
1,000	Amt. = 4,000 lbs Life = 3 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 8,000 lbs Life = 3 months EBCT = 32 mins Vol. = 296 cu.ft.	Amt. = 80,000 lbs Life = 3 months EBCT = 32 mins. Vol. = 2,963 cu.ft.	Amt. = 340,000 lbs Life = 3 months EBCT = 27 mins. Vol. = 12,593 cu.ft.

NOTES: These sizings are informational only and are not intended for design purpose.

The above GAC bed lives are computed, theoretical values. As a practical matter disregard any life in excess of 18 months, because GAC should generally be replaced after this period of service due to bed softening and erosion.

TABLE B-5

CONCEPTUAL SIZINGS: CARBON ADSORPTION

COMPOUND OF INTEREST: 1,2-Dichloroethane

Freundlich Parameters: $K(\text{mg/g}) = 7.42$ $1/n$ (dimensionless) = 0.56
 N.J. Interim Action Level I (mcg/l): 0 to 0.70
 Factor of Safety = 4

Water Concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Amt. = 4,000 lbs Life = 1 month EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 8,000 lbs Life = 1 month EBCT = 32 mins. Vol. = 296 cu.ft.	Amt. = 240,000 lbs Life = 3 months EBCT = 96 mins. Vol. = 8,889 cu.ft.	Amt. = 1,100,000 lbs Life = 3 months EBCT = 88 mins. Vol. = 40,741 cu.ft.

NOTES: These sizings are informational only and are not intended for design purpose.

The above GAC bed lives are computed, theoretical values. As a practical matter disregard any life in excess of 18 months, because GAC should generally be replaced after this period of service due to bed softening and erosion.

TABLE B-6

CONCEPTUAL SIZINGS: CARBON ADSORPTION

COMPOUND OF INTEREST: 1,1-Dichloroethylene

Freundlich Parameters: $K(\text{mg/g}) = 12.6$ $1/n$ (dimensionless) = 0.48
 N.J. Interim Action Level I ($\mu\text{g/l}$): 0 to 7.0
 Factor of Safety = 4

Water Concentration ($\mu\text{g/l}$)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Amt. = 4,000 lbs Life = 30 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 23 months EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 60,000 lbs Life = 23 months EBCT = 24 mins. Vol. = 2,222 cu.ft.	Amt. = 260,000 lbs Life = 20 months EBCT = 21 mins. Vol. = 9,630 cu.ft.
50	Amt. = 4,000 lbs Life = 2 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 2 months EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 120,000 lbs Life = 3 months EBCT = 48 mins. Vol. = 4,444 cu.ft.	Amt. = 560,000 lbs Life = 3 months EBCT = 45 mins. Vol. = 20,741 cu.ft.
100	Amt. = 4,000 lbs Life = 1 month EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 8,000 lbs Life = 1 month EBCT = 32 mins. Vol. = 296 cu.ft.		

NOTES: These sizings are informational only and are not intended for design purpose.

The above GAC bed lives are computed, theoretical values. As a practical matter disregard any life in excess of 18 months; because GAC should generally be replaced after this period of service due to bed softening and erosion.

TABLE B-7

CONCEPTUAL SIZINGS: CARBON ADSORPTION

COMPOUND OF INTEREST: Trans-1,2-dichloroethylene

Freundlich Parameters: $K(\text{mg/g}) = 3.05$ $1/n$ (dimensionless) = 0.51
 N.J. Interim Action Level I ($\mu\text{g/l}$): 0 to 27
 Factor of Safety = 4

Water Concentration ($\mu\text{g/l}$)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
50	Amt. = 4,000 lbs Life = 2 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 1 month EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 160,000 lbs Life = 3 months EBCT = 64 mins. Vol. = 5,926 cu.ft.	Amt. = 760,000 lbs Life = 3 months EBCT = 61 mins. Vol. = 28,148 cu.ft.
100	Amt. = 8,000 lbs Life = 1 month EBCT = 64 mins. Vol. = 296 cu.ft.	Amt. = 16,000 lbs Life = 1 month EBCT = 64 mins. Vol. = 593 cu.ft.		

NOTES: These sizings are informational only and are not intended for design purpose.

The above GAC bed lives are computed, theoretical values. As a practical matter disregard any life in excess of 18 months, because GAC should generally be replaced after this period of service due to bed softening and erosion.

TABLE B-8

CONCEPTUAL SIZINGS: CARBON ADSORPTION

COMPOUND OF INTEREST: Methylene Chloride

Freundlich Parameters: $K(\text{mg/g}) = 0.73$ $1/n$ (dimensionless) = 0.63
 N.J. Interim Action Level I (mcg/l): 0 to 4.8
 Factor of Safety = 4

Water Concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Amt. = 10,000 lbs Life = 1 month EBCT = 80 mins. Vol. = 370 cu.ft.	Amt. = 20,000 lbs Life = 1 month EBCT = 80 mins. Vol. = 741 cu.ft.		

NOTES: These sizings are informational only and are not intended for design purpose.

The above GAC bed lives are computed, theoretical values. As a practical matter disregard any life in excess of 18 months, because GAC should generally be replaced after this period of service due to bed softening and erosion.

TABLE: B-9

CONCEPTUAL SIZINGS: CARBON ADSORPTION

COMPOUND OF INTEREST: Polychlorinated Biphenyls

Freundlich Parameters: $K(\text{mg/g}) = 242$ $1/n$ (dimensionless) = 0.70
 N.J. Interim Action Level I (mcg/l): 0 to 0.007
 Factor of Safety = 4

Water Concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Amt. = 8,000 lbs Life = 1 month EBCT = 64 mins. Vol. = 296 cu.ft.	Amt. = 20,000 lbs Life = 1 month EBCT = 80 mins. Vol. = 741 cu.ft.		

NOTES: These sizings are informational only and are not intended for design purpose.

The above GAC bed lives are computed, theoretical values. As a practical matter disregard any life in excess of 18 months, because GAC should generally be replaced after this period of service due to bed softening and erosion.

TABLE B-10

CONCEPTUAL SIZINGS: CARBON ADSORPTION

COMPOUND OF INTEREST: Tetrachloroethylene

Freundlich Parameters: $K(\text{mg/g}) = 150$ $1/n$ (dimensionless) = 0.46
 N.J. Interim Action Level I (mcg/l): 0 to 0.67
 Factor of Safety = 4

Water Concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Amt. = 4,000 lbs Life = 43 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 32 months EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 60,000 lbs Life = 32 months EBCT = 24 mins. Vol. = 2,222 cu.ft.	Amt. = 260,000 lbs Life = 28 months EBCT = 21 mins. Vol. = 9,630 cu.ft.
50	Amt. = 4,000 lbs Life = 8 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 6 months EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 60,000 lbs Life = 6 months EBCT = 24 mins. Vol. = 2,222 cu.ft.	Amt. = 260,000 lbs Life = 5 months EBCT = 21 mins. Vol. = 9,630 cu.ft.
100	Amt. = 4,000 lbs Life = 4 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 3 months EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 60,000 lbs Life = 3 months EBCT = 24 mins. Vol. = 2,222 cu.ft.	Amt. = 300,000 lbs Life = 3 months EBCT = 24 mins. Vol. = 11,111 cu.ft.
1,000	Amt. = 10,000 lbs Life = 1 month EBCT = 80 mins. Vol. = 370 cu.ft.	Amt. = 20,000 lbs Life = 1 month EBCT = 80 mins. Vol. = 741 cu.ft.		

NOTES: These sizings are informational only and are not intended for design purpose.

The above GAC bed lives are computed, theoretical values. As a practical matter disregard any life in excess of 18 months, because GAC should generally be replaced after this period of service due to bed softening and erosion.

TABLE B-11

CONCEPTUAL SIZINGS: CARBON ADSORPTION

COMPOUND OF INTEREST: 1,1,1-Trichloroethane

Freundlich Parameters: $K(\text{mg/g}) = 32$ $1/n$ (dimensionless) = 0.70
 N.J. Interim Action Level I (mcg/l): 0 to 20.0
 Factor of Safety = 4

Water Concentration (mcg/l)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
50	Amt. = 4,000 lbs Life = 5 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 4 months EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 60,000 lbs Life = 4 months EBCT = 24 mins. Vol. = 2,222 cu.ft.	Amt. = 260,000 lbs Life = 3 months EBCT = 21 mins. Vol. = 9,630 cu.ft.
100	Amt. = 4,000 lbs Life = 2 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 2 months EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 120,000 lbs Life = 3 months EBCT = 48 mins. Vol. = 4,444 cu.ft.	Amt. = 600,000 lbs Life = 3 months EBCT = 48 mins. Vol. = 22,222 cu.ft.

NOTES: These sizings are informational only and are not intended for design purpose.

The above GAC bed lives are computed, theoretical values. As a practical matter disregard any life in excess of 18 months, because GAC should generally be replaced after this period of service due to bed softening and erosion.

TABLE B-12

CONCEPTUAL SIZINGS: CARBON ADSORPTION

COMPOUND OF INTEREST: Trichloroethylene

Freundlich Parameters: $K(\text{mg/g}) = 98$ $1/n$ (dimensionless) = 0.69
 N.J. Interim Action Level I ($\mu\text{g/l}$): 0 to 3.1
 Factor of Safety = 4

Water Concentration ($\mu\text{g/l}$)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
10	Amt. = 4,000 lbs Life = 20 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 15 months EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 60,000 lbs Life = 15 months EBCT = 24 mins. Vol. = 2,222 cu.ft.	Amt. = 260,000 lbs Life = 13 months EBCT = 21 mins. Vol. = 9,630 cu.ft.
50	Amt. = 4,000 lbs Life = 3 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 2 months EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 80,000 lbs Life = 3 months EBCT = 32 mins. Vol. = 2,963 cu.ft.	Amt. = 400,000 lbs Life = 3 months EBCT = 32 mins. Vol. = 14,815 cu.ft.
100	Amt. = 4,000 lbs Life = 1 month EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 1 month EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 160,000 lbs Life = 3 months EBCT = 64 mins. Vol. = 5,926 cu.ft.	Amt. = 800,000 lbs Life = 3 months EBCT = 64 mins. Vol. = 29,630 cu.ft.

NOTES: These sizings are informational only and are not intended for design purpose.

The above GAC bed lives are computed, theoretical values. As a practical matter disregard any life in excess of 18 months, because GAC should generally be replaced after this period of service due to bed softening and erosion.

TABLE B-13

CONCEPTUAL SIZINGS: CARBON ADSORPTION

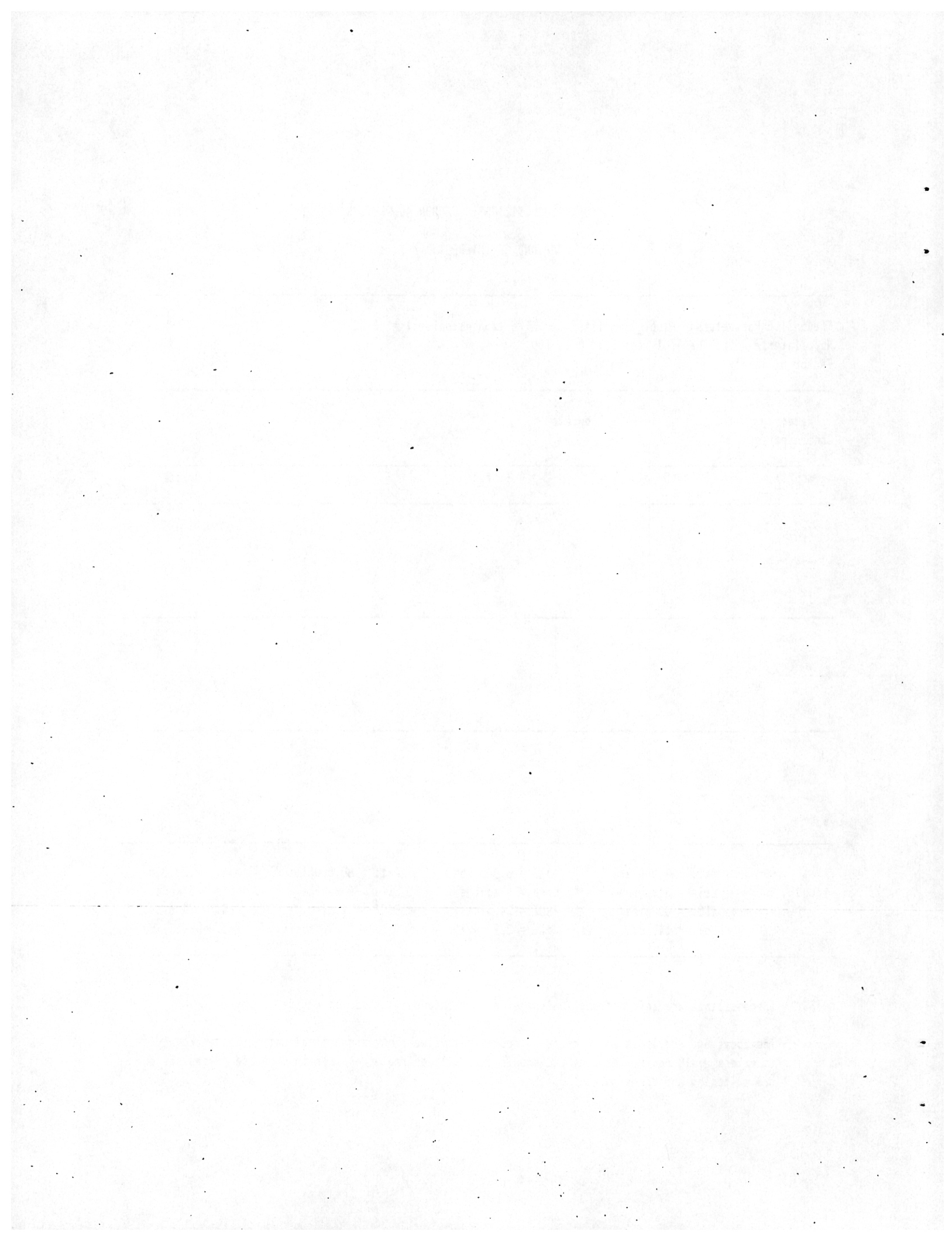
COMPOUND OF INTEREST: M-Xylene

Freundlich Parameters: $K(\text{mg/g}) = 114$ $1/n$ (dimensionless) = 0.32
 N.J. Interim Action Level I ($\mu\text{g/l}$): 0 to 100
 Factor of Safety = 4

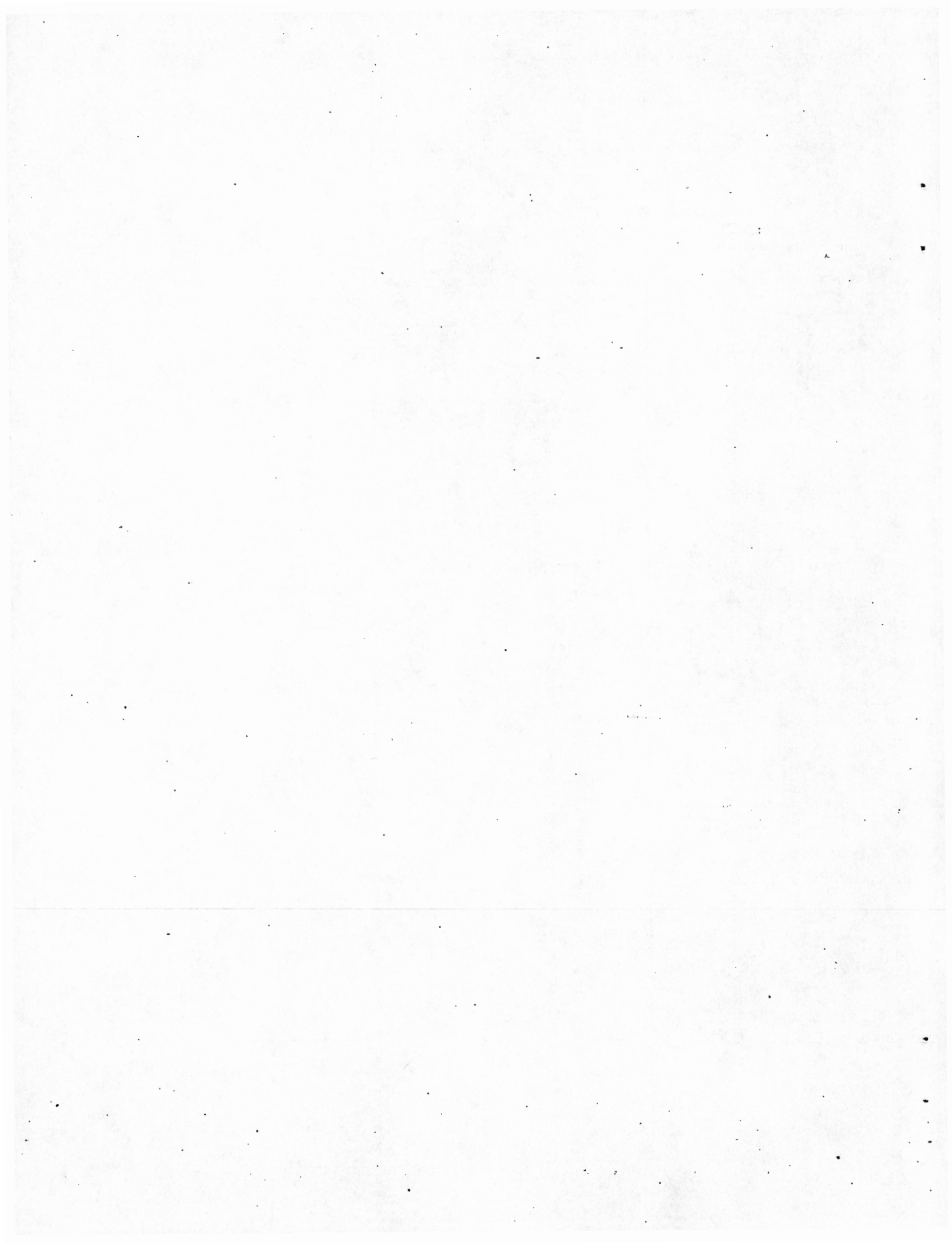
Water Concentration ($\mu\text{g/l}$)	Flowrate			
	0.05 mgd	0.1 mgd	1.0 mgd	5.0 mgd
1,000	Amt. = 4,000 lbs Life = 5 months EBCT = 32 mins. Vol. = 148 cu.ft.	Amt. = 6,000 lbs Life = 4 months EBCT = 24 mins. Vol. = 222 cu.ft.	Amt. = 60,000 lbs Life = 4 months EBCT = 24 mins. Vol. = 2,222 cu.ft.	Amt. = 250,000 lbs Life = 3 months EBCT = 20 mins. Vol. = 9,259 cu.ft.

NOTES: These sizings are informational only and are not intended for design purpose.

The above GAC bed lives are computed, theoretical values. As a practical matter disregard any life in excess of 18 months, because GAC should generally be replaced after this period of service due to bed softening and erosion.



Appendix C



APPENDIX C

NUMBER OF WATER ANALYSIS SAMPLES IN CDM DATABASE

Purveyor ID#	Purveyor name	No. of samples taken
ATLANTIC COUNTY		
0102001	Atlantic City Water	47
0103001	Brigantine Water Dept.	10
0100014	Tower East Mobile Home Park	1
0111002	Seaview Country Club	1
0111004	Pomona Mobile Home Park	1
0112001	Hamilton Twp. MUA	21
0116001	Margate City Water Dept.	5
0119001	Cozy Oaks Trailer Park	2
0122001	Ventnor City Water Dept.	2
BERGEN COUNTY		
0201001	Allendale Water Dept.	40
0217001	Fairlawn Water Dept.	27
0220001	Hackensack Water Co.-Franklin Lk.	1
0221001	Garfield Water Dept.	1
0228001	Ho-Ho-Kus Water Dept.	6
0231001	Lodi Water Dept.	119
0232001	Lyndhurst Water Dept.	3
0233001	Mahwah Water Dept.	8
0238001	Hackensack Water Co.	67
0247001	Park Ridge Water Dept.	18
0251001	Ridgewood Water Dept.	100
0264001	Waldwick Water Dept.	5
0265001	Wallington WD	46
BURLINGTON COUNTY		
0305001	Burlington City Water Dept.	5
0306001	Burlington Twp. Water Dept.	16
0313001	Evesham Twp. MUA	3
0313002	Kings Grant Mgmt. Corp.	1
0315001	Florence Twp.	2
0318001	Columbus Water Co.	2
0318002	Homestead Water Utility	1
0319001	Maple Shade Water Dept.	4
0322001	Moorestown Water Dept.	15
0324001	Mount Laurel MUA	1

APPENDIX C
(continued)

NUMBER OF WATER ANALYSIS SAMPLES IN CDM DATABASE

Purveyor ID#	Purveyor name	No. of samples taken
BURLINGTON COUNTY		
0326005	Cedar Grove Apts.	1
0329004	Pemberton Twp.	4
0329005	Pineview Terrace	1
0332001	Fawn Lake Village	4
0338001	Willingboro MUA	2
CAMDEN COUNTY		
0404001	Bellmawr Water Dept.	12
0408001	City of Camden Water Dept.	139
0408002	New Jersey Water Co-Camden Div	1
0410001	Town & Country M.H. Park	1
0412001	Collingwood Water Dept.	6
0413001	772 Radar Squadron	1
0414001	Gloucester City Water Dept.	4
0415001	Camden County Hospital	1
0415002	Garden State W. Co.-Blackwood	8
0418001	N.J. Water Co.-Haddon Div.	6
0424001	Merchantville-Pensauken	20
0428002	Pine Hill Boro MUA	1
CAPE MAY COUNTY		
0506008	Middle Twp. Water Dist. 1	3
0511007	Shore Acres Mobile Home Park	3
0514001	Wildwood Water Dept.	44
CUMBERLAND COUNTY		
0601001	Bridgeton Water Dept.	14
0605003	Tips Trailer Park	3
0810001	Millville Water Co.	13
0612001	Fogg Mobile Homes	1
0614003	Vineland City Water Dept.	8

APPENDIX C
(continued)

NUMBER OF WATER ANALYSIS SAMPLES IN CDM DATABASE

Purveyor ID#	Purveyor name	No. of samples taken
ESSEX COUNTY		
0703001	Caldwell Water Dept.	4
0705001	East Orange Water Dept.	12
0706001	Essex Fells Water Dept.	9
0707001	Fairfield Water Dept.	42
0710001	Livingston Twp. Div. of Water	8
071200?	Commonwealth Water Co.	15
0713001	Montclair Water Bureau	15
0715001	North Caldwell Water Dept.	2
0717001	Orange Water Dept.	11
0718001	Roseland Water Dept.	2
0719001	South Orange Water Dept.	1
GLOUCESTER COUNTY		
0802001	Deptford Twp. MUA	6
0806001	Glassboro Water Dept.	8
0810004	Mantua Twp. MUA	53
0811002	Monroe Twp. MUA	13
0813001	Newfield Water Dept.	2
0814001	Paulsboro Water Dept.	9
0815001	Pitman Water Dept.	4
0817001	Swedesboro Water Dept.	3
0818004	Washington Twp. MUA	2
0822001	Woodbury Water Dept.	8
HUDSON COUNTY		
0901001	Harrison Water Dept.	2
0905001	Hoboken Water Dept.	8
0906001	Jersey City Water Dept.	27
0907001	Kearny Water Dept.	3
HUNTERDON COUNTY		
1003001	Bloomsbury Water Co.	18
1012001	Glen Gardener Water Dept.	7
1017001	Lambertville Water Co.	5

APPENDIX C
(continued)

NUMBER OF WATER ANALYSIS SAMPLES IN CDM DATABASE

Purveyor ID#	Purveyor name	No. of samples taken
MERCER COUNTY		
1101002	East Windsor MUA	18
1103001	Garden State W. Co.-Hamilton Sq.	5
1104001	Hightstown Water Dept.	3
1111001	Trenton Water Dept.	56
MIDDLESEX COUNTY		
1202001	Cranbury Twp. Water Dept.	2
1204001	East Brunswick Water Dept.	5
1213002	Monroe Twp. MUA	11
1214001	New Brunswick Water Dept.	31
1215001	North Brunswick Water Dept.	9
1218001	Holiday Inn at Princeton	1
1219001	Sayreville Water Dept.	16
1221004	South Brunswick Twp.	90
1225001	Middlesex Water Co.	6
MONMOUTH COUNTY		
1315001	Freehold Boro Water Dept.	8
1319002	Howell Twp-Aldrich Water Co.	12
1328002	Marlboro Twp. MUA	1
1330001	Aberdeen Twp. MUA	9
1340001	Red Bank Water Dept.	3
1345001	Monmouth Cons. Water Co.	17
1352003	Wall Twp. Water Dept.	11
MORRIS COUNTY		
1401001	Boonton Water Dept.	54
1406001	Chester Water Co.	5
1408001	Denville Twp. Water Dept.	3
1409001	Dover Water Dept.	85
1410001	E. Hanover Twp. Water Dept.	54
1410002	U.S. Army Housing-Livingston	2
1411001	Florham Park Water Dept.	2
1414000	Loziers Trailer Park	1
1414008	Makepeace Mobile Home Park	1

APPENDIX C
(continued)

NUMBER OF WATER ANALYSIS SAMPLES IN CDM DATABASE

Purveyor ID#	Purveyor name	No. of samples taken
MORRIS COUNTY		
1414011	Jefferson Twp.-Lake Hopatcong	17
1414012	Jefferson Twp.-Winona Lake	16
1417001	Madison Water Dept.	10
1418001	Mendham Water Dept.	3
1421003	Montville Twp. MUA	5
1424001	Southeast Morris County MUA	29
1425001	Mountain Lakes Water Dept.	3
1426001	Mt. Arlington Water Co.	1
1427009	West Jersey Water Service Inc.	2
1429001	Parsipanny-Troy Hills WD	5
1434001	Rockaway Boro Water Dept.	1
1435002	Rockaway Twp. Water Dept.	106
1435004	U.S. Arradcom	8
1436001	Hercules Inc.	2
1436002	Roxbury Water Co.	21
1439001	Wharton Water Dept.	8
OCEAN COUNTY		
1505003	Shore Water Co.	1
1506001	Brick Twp. MUA	40
1507005	Toms River Water Co.	3
1511001	Jackson Twp. MUA	17
1511008	South Wind Mobile Home Village	1
1513001	Lakehurst Water Dept.	13
1516001	Little Egg Harbor Twp. MUA	3
1517002	Long Beach Water Dept.	8
1518007	Ridgeway Mobile Home Crt. Sys. 1	1
1523003	New Egypt Water Co.	3
PASSAIC COUNTY		
1603001	Haledon Water Dept.	30
1604001	Hawthorne Water Dept.	34
1605002	Little Falls/P.V.W.C.	35
1609001	Pompton Lakes MUA	2
1611003	Ringwood Water Dept.-Windbeam	1
1612001	Totowa Water Dept.	39

APPENDIX C
(continued)

NUMBER OF WATER ANALYSIS SAMPLES IN CDM DATABASE

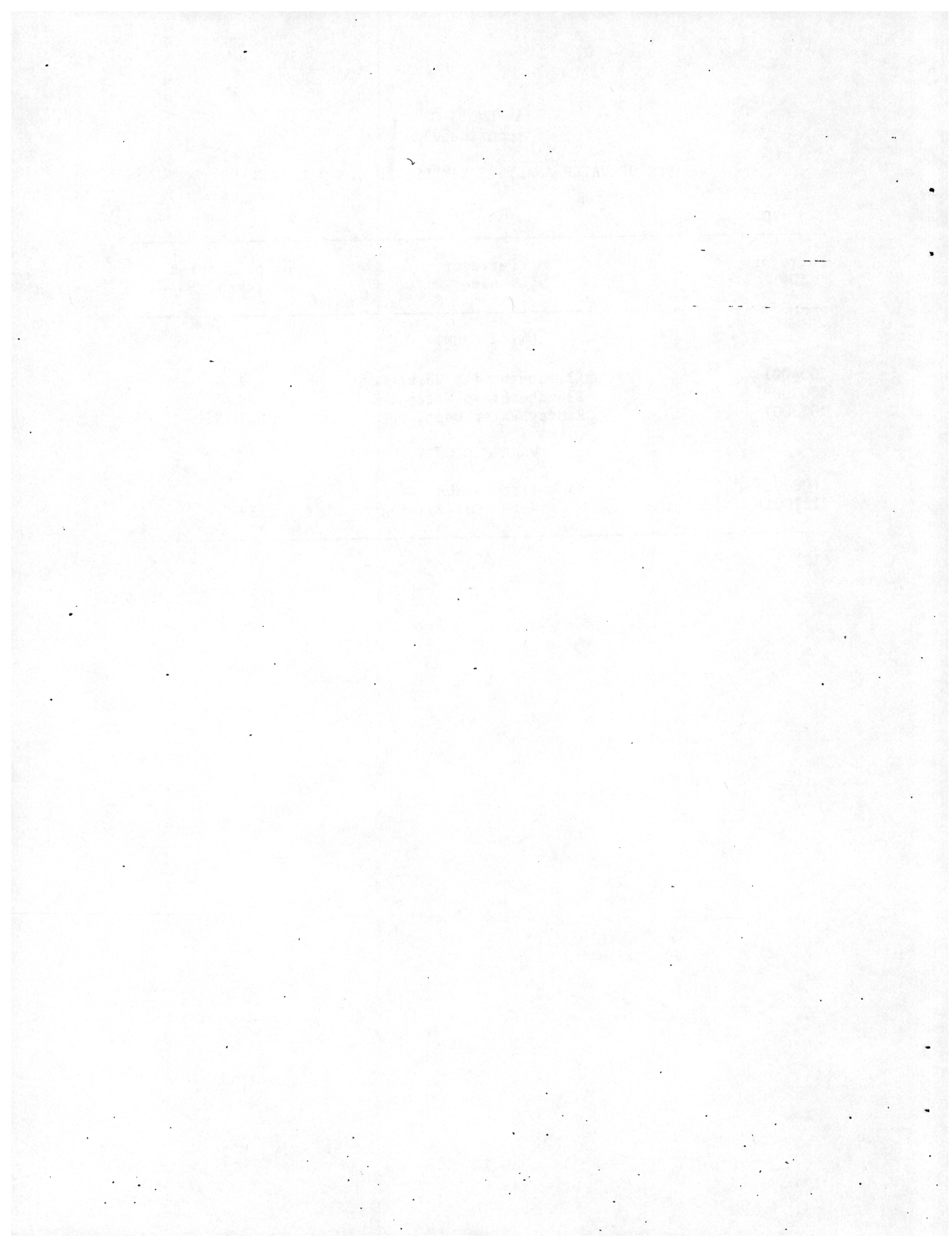
Purveyor ID#	Purveyor name	No. of samples taken
PASSAIC COUNTY		
1615003	West Milford Twp. MUA-Parkway	2
1615008	Post Brook Mun. Water Dept.	7
1615013	W Milford-Camelot Estates	1
1615014	West Milford MUA-Crescent Park	5
1615015	West Milford Twp. MUA Highview	3
1615016	West Milford-Olde Milford	1
1615017	Wonder Lake Properties	1
1616001	West Paterson Water Dept.	1
SALEM COUNTY		
1707001	Penns Grove Water Supply Co.	13
1710003	Picnick Grove Mobile Homes	1
SOMERSET COUNTY		
1808001	Franklin Twp. Public Works	1
1811001	Manville Water Dept.	1
1817001	Rocky Hill Water Dept.	23
SUSSEX COUNTY		
1903001	Branchville Water Dept.	7
1904004	North Shore Water Assoc.	3
1904007	Colby Water Co.	2
1904009	Byram Homeowners Assoc.	1
1906002	Franklin Board of Public Works	60
1909001	Hamburg Board of Public Works	1
1911003	Lake Tamarack Water Co.	2
1912009	High Crest Water Assoc.	1
1912010	Charles St. Community Assoc.	1
1915001	Newton Water and Sewer Utility	2
1919001	Stanhope Water Dept.	4
1920001	Stillwater Twp. Water District	1
1921001	Sussex Water Dept.	3
1922008	Vernon Water Dept.	1

APPENDIX C
(continued)

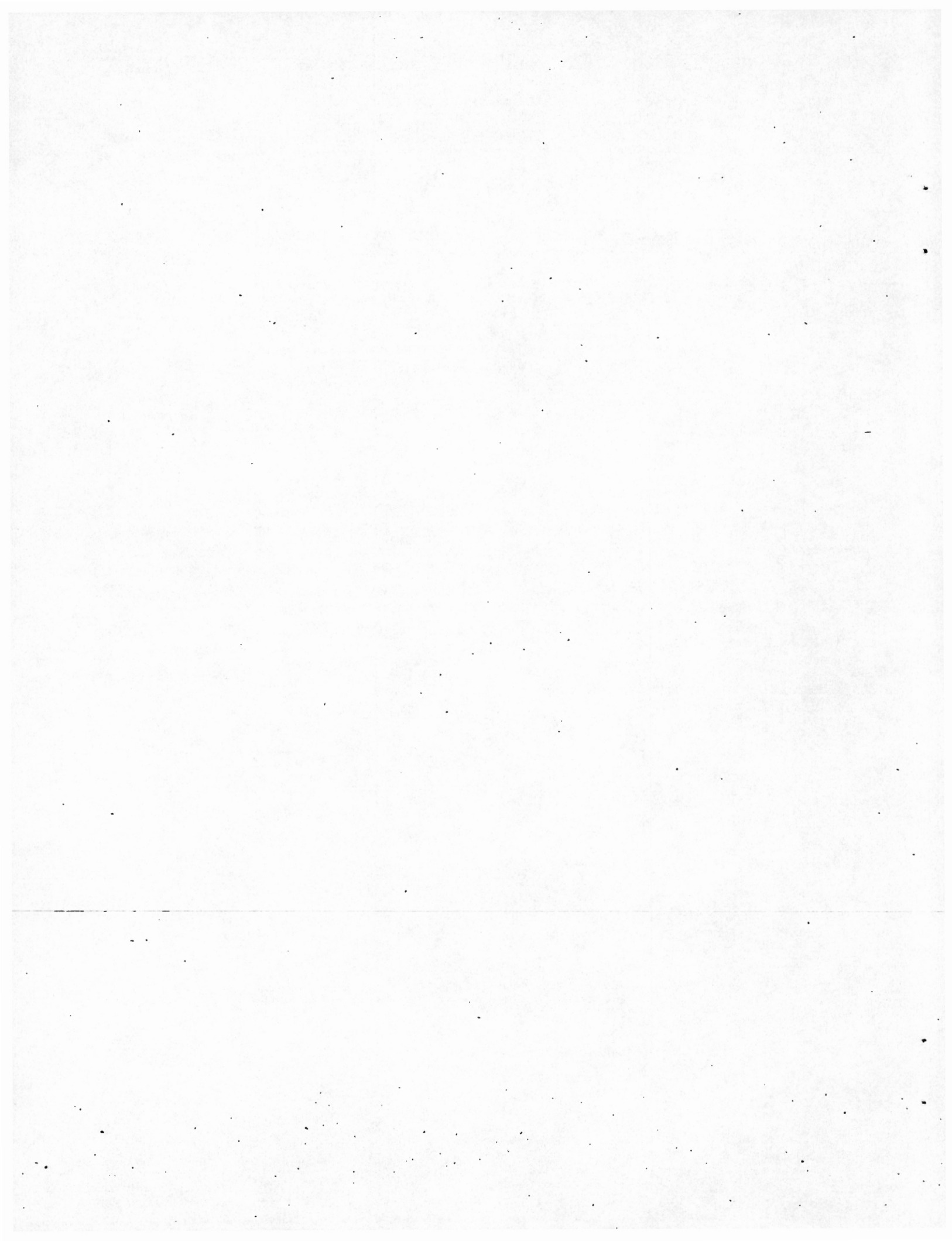
NUMBER OF WATER ANALYSIS SAMPLES IN CDM DATABASE

Purveyor ID#	Purveyor name	No. of samples taken
UNION COUNTY		
2004001	Elizabeth City Water Dept.	2
2004008	Elizabethtown Water Co.	19
2013001	Rahway Water Dept.	17
WARREN COUNTY		
2108001	Hackettstown MUA	2
2121001	N.J. Water Co.-Washington Dist	39

(19)



Appendix D



APPENDIX D

GLOSSARY OF TECHNICAL TERMS

- abrasion number. Resistance of granular carbon particles to degradation on handling. Calculated by contacting a carbon sample with steel balls on a Ro-Tap machine and determining the percent ratio of the final mean particle diameter to the original mean particle diameter.
- activated carbon. Powdered or granule particles made from hydrocarbon or carbohydrate sources. The carbon residue left after distillation which has a porous structure, further eroded and purged to produce a maximum surface area. Provides for physical absorption (not chemical) of gases, inorganic matter and organic molecules; therefore useful for removing organics already oxidized and odorous constituents rendered innocuous by oxidation. Powdered activated carbon is added to water to adsorb organics. Granular activated carbon can replace sand or coal in a filter bed and serves the dual purpose of filtration and adsorption.
- activated carbon working capacity. Amount of impurities that activated carbon can adsorb. The amount of adsorbate which can be desorbed. The amount that can be re-adsorbed on an adsorbent after regeneration.
- adsorbate. Any substance that is or can be adsorbed onto the surface of another substance.
- adsorbent. Substance which physically or chemically accumulates other substances on its surface.
- adsorption. The phenomenon whereby molecules adhere to a surface with which they come in contact.
- adsorption isotherms. A measurement of adsorption determined at a constant temperature by varying the amount of carbon used or the concentration of the impurity in contact with the carbon.
- aeration. The process of causing intimate contact between air and a liquid, resulting in reduction of: taste and odor-producing substances (such as hydrogen sulfide and some volatile organic compounds); substances increasing corrosive action or interfering

	with chemicals used in treatment; or removal of volatile compounds.
	Used as a pretreatment step to oxidize metallic contaminants (e.g., iron).
aerator.	Device creating aeration by generating turbulence or adding air.
agitator.	Mechanical apparatus for mixing, aerating or creating turbulence. Mechanical agitators are used in chemical preparation, flash mixing and flocculation.
air binding.	Entrained air which causes clogging in a pipe, filter or pump.
air bound.	Pipe or filter obstructed by entrapment of air.
air flotation.	See, flotation.
air-pressure-drop gradient.	A measure of the air pressure loss per unit distance due to friction with column packing.
air relief valve.	Air valve placed at the top of a pipe for prevention of air binding (see, air binding).
air-to-water ratio.	The ratio of air loading to water loading on a volumetric basis.
air wash.	A process using compressed air mixed with water in the backwashing or cleaning stage of a filtering process.
alkalinity.	Capacity of water to neutralize acids. Alkalinity results from the presence of carbonates, bicarbonates, hydroxides, borate, silicate and/or phosphates. Alkalinity is expressed in equivalent milligrams of calcium carbonate per liter of water (mg/l as CaCO ₃).
apparent density.	The weight per unit volume of activated carbon.
ash.	The mineral oxide constituents of activated carbon. Normally referred to in a weight percent basis after a given amount of sample is oxidized.
A.W.W.A.	American Water Works Association.
bed depth.	The amount of carbon (expressed in length units) that is parallel to the flow of the

stream and through which the stream must pass.

breakpoint. First appearance in filter or adsorber effluent of turbidity or adsorbate breakthrough.

breakthrough. At the point at which an activated carbon bed becomes exhausted the mass transfer zone approaches the end of the bed. Increasingly higher concentrations of the adsorbate are observed until the effluent concentration equals the influent concentration.

breakthrough capacity. Amount of filtered or adsorbed substance that a filter or adsorbent contains at breakthrough.

breakthrough time. Time from filter or adsorbent backwashing to the breakpoint.

carbon column. A column filled with granular activated carbon. The primary function is preferential adsorption of a particular type or types of molecules.

Celsius. See, centigrade.

centigrade A temperature scale. To calculate centigrade from Fahrenheit, subtract 32° from the degree Fahrenheit and multiply by 5/9.

channeling. A phenomenon that occurs frequently in a packed column operation. If packing pieces are not evenly situated against each other in the column, large unoccupied open spaces may be created and scattered throughout the column. This provides easy passage for both downward liquid flow and upward gas flow. Liquid traveling down the column along the outer surface of the packing is referred to as "channeling." The passage of gas through the open area inside the column at high velocities produces the "chimney" effect. In both instances, liquid- and gas-flow patterns are distorted, resulting in an abrupt change in the packing-performance pattern, poorer mass transfer rates, and high-pressure drops. It is important to note that the channeling effect is more pronounced along the column wall. "Wall channeling" is detrimental to column performance.

chemical dose. (1) Specific quantity of chemical applied to a specific quantity of fluid. (2) Quantity of material applied for a specific effect.

chlorination. Chlorine is added to water and react with any reducing agents present. When this demand is met, additional chlorine forms chloramines showing a combined available chlorine residual. (Also effective as disinfectants). When all ammonia present has been reacted with, a free available chlorine residual develops, oxidizing previously produced chloramines and creating oxidized nitrogen compounds. When oxidized, all additional chlorine at this point, or breakpoint, becomes a residual of free available chlorine for disinfection. Rate of bactericidal action primarily depends upon the concentration of free residual.

chlorine. A chemical disinfectant with strong oxidizing power that destroys the enzymatic processes of bacterial cells needed for survival (see chlorination). An extremely hazardous gas. The most commonly used disinfectant in United States.

chlorine residual. See, free available chlorine residual, and combined available chlorine residual.

combined available residual chlorine. Chlorine in solution existing in chemical combination with ammonia (chloramines) or organic nitrogen compounds. Less effective disinfectant than free available residual chlorine.

color bodies. Those complex molecules which impart color (usually undesirable) to a solution.

community water service. A public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

concentration. (1) Quantitative measure of chemicals in a solution. Usually a percentage or ratio of chemical to solvent (e.g., mg/l, lb/gal, ppm, etc.). (2) Process of increasing dissolved solids per unit volume of solution, usually by evaporation of solution.

contaminant. Any physical, chemical, biological, or radiological substance or matter in water.

conventional treatment.	The water treatment process that incorporates rapid mix, flocculation, sedimentation, and rapid sand filtration. Used to remove turbidity (i.e., suspended solids), color, bacteria, iron, etc.
cross sectional bed area.	The area of granular activated carbon or air stripper packing through which the stream flow is perpendicular.
desorption.	The opposite of adsorption. A phenomena whereby an adsorbed molecule leaves the surface of the adsorbent.
detention time.	The volume of a container divided by a given rate of inflow or discharge from the container. The theoretical time required for a fluid particle to pass through a container under specified flow conditions. For example, a 1-million gallon sedimentation basin flowing at a rate of 4,200 gpm would have a four-hour detention time.
diffusion.	The process by which a contaminant tends to migrate in a fluid medium from an area of high concentration to an area of low concentration.
diffused-air aerator.	A tank in which compressed air is injected through perforated pipes, or some porous diffuser tubes or plates, producing fine bubbles.
diffusion coefficient.	Value that describes the degree of diffusion for a particular contaminant in a particular medium in the direction of the concentration gradient. Also called diffusivity.
disinfectant.	Any oxidant added to water in any part of a treatment or distribution process, that is intended to kill or inactivate disease-producing (pathogenic) microorganisms.
disinfection.	The process of destroying or deactivating, although not necessarily to the point of sterilization, pathogenic organisms in water to a potable level. The efficiency of the process depends upon the kind and concentration of organisms to be destroyed, the kind and concentration of the disinfectant, contact time, chemical character, and temperature of the water to be treated.

drinking water standards.	Standards for the quality of drinking water from surface water, ground water, or bottled water sources, imposed by federal, state or local authorities.
efficiency.	The ratio of total output to total input.
empty-bed contact time (EBCT).	The theoretical residence time that the water flow would have if the filter media were removed from a filter bed.
exhaustion.	The point at which an adsorption media is incapable of adsorbing any additional contaminant.
filter.	Device to remove solid or colloidal material from the liquid which passes through it. There are several types of filtering media, e.g., granular material, fine cloth, unglazed porcelain, or specially-prepared paper.
finished water.	Water that has completed the desired treatment processes, or that enters a distribution system.
flooding.	An undesirable phenomenon in which an air-stripping tower fills with water.
free available residual chlorine.	Excess chlorine existing as hypochlorous acid or hypochlorite ion.
fouling.	The accumulation of deposits, dirt and particulate matter on the packing surfaces. Spaces inside the column where liquid flow is virtually non-existent are susceptible to fouling and plugging. This occurs most frequently with sweeping surfaces. Again, adverse effects on mass transfer and pressure drop will result from fouling and plugging of the packing.
gas chromatograph.	Analytical device used to identify and separate organic compounds in water by preferential adsorption of chemical compounds in an ascending molecular-weight sequence onto a solid adsorbent material. Used to measure trihalomethanes in water.
influent.	Liquid flowing into a system, tank, or plant.
interlocking.	This refers to the interlocking or meshing together of different packing pieces inside a packed-column. This happens when packings lack geometric uniformity or are structurally

prone to either intruding into or being intruded into by other packing pieces. Interlocking creates distorted gas/liquid-flow patterns and spaces where solid deposits and build-up can happen. This can adversely affect the column performance. In addition, interlocking leads to settling of packing and, consequently, to reduction of effective packing height. In crossflow-packed columns, it becomes a more serious problem when settling of packing renders the top portion open and creates channeling and chimney effects.

iodine number. The iodine number is the milligrams of iodine adsorbed by one gram of carbon at a filtrate concentration of 0.02N iodine.

isotherm. See, adsorption isotherm.

K_L . Mass-transfer coefficient based on liquid-phase concentration units (ms^{-1}).

$K_L a$. The overall mass-transfer coefficient. It represents a crucial parameter in the mathematical description of the air-stripping process.

loading. The volume flux of the water through the packing in a packed-tower air stripper.

macropore. Pores in activated carbon which are larger in diameter than 1,000 angstroms.

mass-transfer coefficient. A numerical coefficient that describes the tendency of a contaminant to move across the interface of one medium to another.

mass transfer zone. Region in a carbon bed in which the concentration of the adsorbate of interest in the treated fluid decreases from influent concentration to the lowest detectable concentration.

maximum contaminant level (MCL). The limit, established by a governing body, of the maximum permissible level of a contaminant in water delivered to the free flowing outlet of the ultimate user of a public water system. Except in the case of turbidity where the maximum permissible level is measured at the point of entry to the distribution system. Contaminants added to the water under circumstances controlled by the user, except those resulting from corrosion of piping and plumbing caused by

	water quality, are excluded from this definition.
micropore.	Pores in activated carbon which range in diameter from 10 to 1,000 angstroms.
minimum detention limit (MDL).	The minimum concentration of a contaminant that can be analytically detected using presently available methods.
moisture.	The percent by weight of water adsorbed on activated carbon. For all coal-derived Pittsburgh Activated Carbons this is less than 2 percent as packed.
molality.	The number of gram molecular weights dissolved in one liter of water. The resulting solution has a volume greater than one liter.
molal volume.	The volume displaced by one mole of molecules of an individual compound.
molarity.	The number of gram molecular weights in one liter of a solution.
mole.	6.02×10^{23} molecules.
mole fraction.	The ratio of the number of moles of a contaminant divided by the total number of moles of all liquids in the solution.
molecular weight.	Sum of the atomic weights (relative scale, one unit being 1/12 the mass of the C^{12} atom) of all atoms of a molecule.
multiple tray aerators.	Series of trays with flat, perforated, or wire mesh bottoms over which water is distributed and caused to fall to a collection basin.
non-community water system.	A public water system that is not a community water system (see, community water system).
onsite regeneration.	In water treatment, the thermal reactivation of granular activated carbon at or near the location where the carbon is used.
organic chemicals.	Compounds that include and are built upon the carbon molecule.
organohalide.	Chemicals formed from the reaction of organic compounds and halogens.

partial pressure. Also referred to as vapor pressure. This is the theoretical contribution to the gas pressure in a closed container that a particular solute would produce.

parts per billion (ppb). Dimensionless unit used to express concentration. It is the ratio of grams of a chemical solid per one billion grams of water (same as micrograms per liter or mcg/l).

pH. Negative logarithm of the hydrogen-ion concentration. Higher concentration means lower pH value representing higher acidity.

piloting. The method by which a small-scale experiment of a full-scale installation is performed; as in "pilot plant."

pilot tests. Reproduction of the processes occurring in a treatment plant, by means of a scaled-down practical version for a laboratory. Various tests are run to determine optimum chemical dosage, detention times, and to determine which processes are most effective for a particular goal.

pore volume. The difference in the volumetric displacement by granular activated carbon in mercury and in helium at standard conditions.

porous. The property of having small passages permeable by fluids.

potable. Can be consumed without concern for adverse effects upon health.

precipitate. (1) To chemically alter a solution in order to render one of its components insoluble, thereby making possible its removal from the solution. (2) Solids which settle from a settling process (e.g., sedimentation basin sludge).

prechlorination. ~~The application of chlorine to water prior to treatment.~~

precipitation. (1) Sedimentation of suspended particles from a fluid. (2) Passing of a liquid substance in solution out of solution by changing into a solid form.

pressure. Force per unit area. Usually measured as the magnitude above atmospheric pressure (gauge pressure), but can be measured to include atmospheric pressure (absolute pressure).

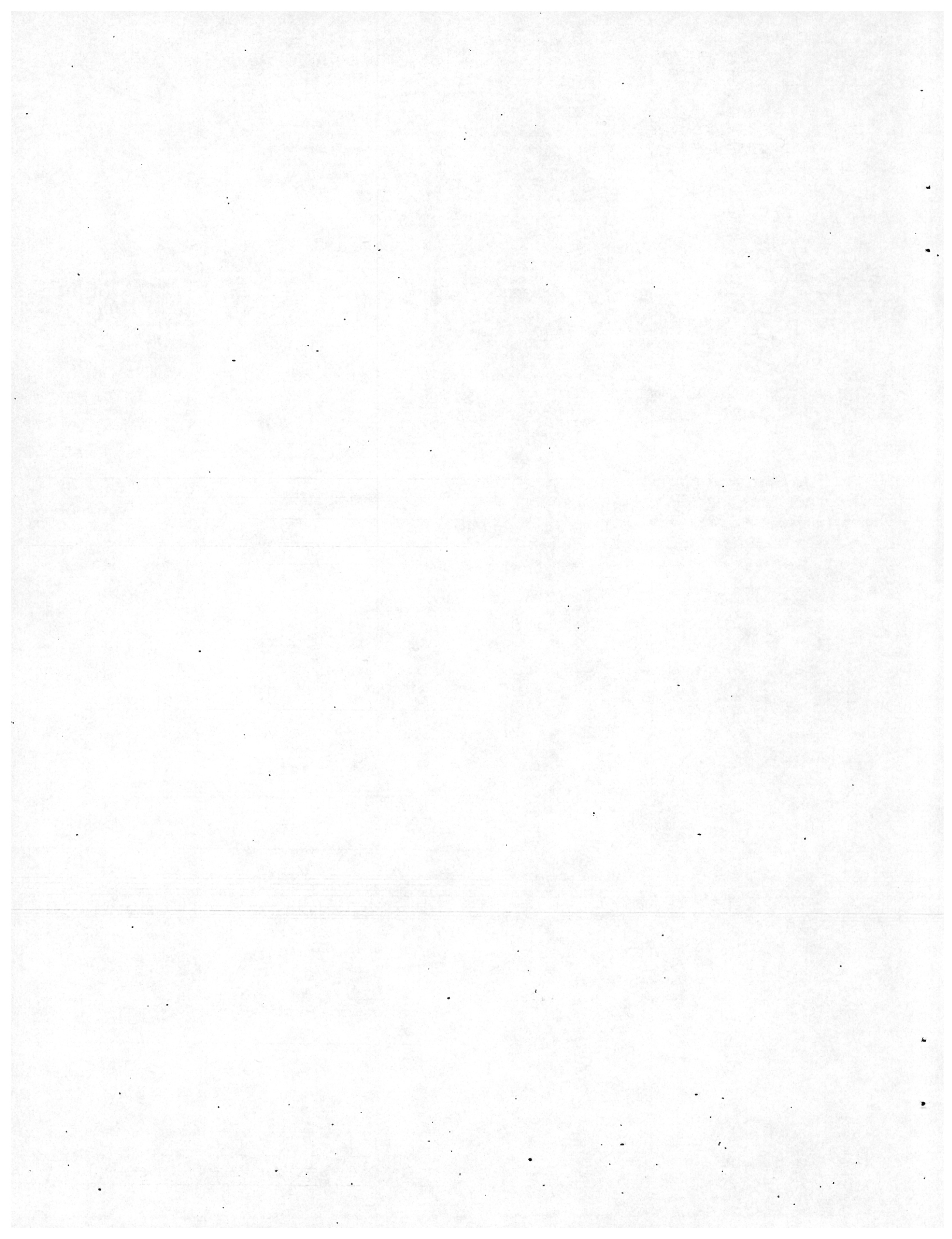
pretreatment.	(1) Any sequence of unit processes designed to facilitate or assist subsequent treatment processes (see, prechlorination). (2) Flash mixing, flocculation, and sedimentation in a conventional treatment plant.
proprietary name.	Product identifying word, phrase, or symbol, the rights to which are held by one manufacturer, to the exclusion of all others.
public water system.	A system for the provision to the public of piped water for human consumption, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. Such term includes (1) any collection, treatment, storage, and distribution facilities under control of the operator of such system and used primarily in connection with such system, and (2) any collection or pretreatment storage facilities not under such control which are used primarily in connection with such a system. A public water system is either a "community water system" or a "non-community water system."
raw water.	Untreated water.
reaction time.	Length of time required for two or more substances to interact forming other substances, in a chemical reaction, or in simple mixing.
reactivation.	The removal of adsorbates from spent granular activated carbon which will allow the carbon to be reused. This is also called regeneration.
sieve size.	The particle size of granular activated carbon as determined by the U.S. Sieve Series. Particle size distribution within a mesh series is given in the specifications of the particular Pittsburgh carbon.
solubility.	Ability of a solid substance to dissolve in a solvent such as water or alcohol.
solute.	The substance dissolved in a solution.
solution.	Liquid resulting from the addition of a substance (solute) to a liquid (solvent).
solvent.	Liquid used to dissolved a substance.

sorption.	Binding of one substance with another by means of absorption or adsorption.
spray aerators.	Fixed nozzles on a pipe distribution grid through which water is forced into the air (as in a fountain).
surface area (GAC).	The surface area of granular activated carbon is determined by the Brunauer, Emmett and Teller Method (BET Method), which utilizes the adsorption of nitrogen at its liquid temperature in the calculation. Surface area is usually expressed in square meters per gram of carbon. Pittsburgh carbons range from 700 to 1,200 square meters per gram.
total trihalo-methanes (TTHM).	The sum of the concentration in mg/l of the trihalomethane compounds [trichloromethane (chloroform), dibromochloromethane, bromodichloromethane, and tribromomethane (bromoform)], rounded to two significant figures. Regulated by the EPA as a primary standard in drinking water (MCL 0.10mg/l).
toxicity.	Quantitative measure of harmful effects and concentrations of a chemical substance when introduced to the environment of living organisms. Also expressed in LD ₅₀ , or concentration when only half the test organisms consuming the chemical live.
trihalomethane.	An organic compound, derivative of methane, wherein three of the four hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure (MCL 0.10 mg/l).
turbidity.	Measure of clarity of a liquid clouded by suspension of colloidal liquid droplets or fine solids.
uniformity of liquid and gas flow.	Within a packed column, uniformity is essential to the column performance. For reasons mentioned earlier, poor distribution of gas and liquid often mirrors the occurrence of channeling/chimney, interlocking and fouling/plugging. It is certainly detrimental to the mass transfer and pressure-drop performance aspects of column packings.
unit process.	A particular complete step in the treatment of water (e.g., coagulation, flocculation, sedimentation, or filtration).

van der Waals Force.	Molecular cohesive force of attraction between particles, inversely proportionate to the third power of the distance between each particle. This force is electromagnetic and arises from the oscillation of dipoles in the atoms or molecules themselves. The force is responsible for colloid particle aggregation or adhesion to filter grains on surfaces, and can have a distance of interaction up to 0.1 micrometers.
viscosity.	A measure of a fluid's resistance to flow.
voids.	The percent by volume of the interstices to total bed volume.
volatile.	Capable of being evaporated at relatively low temperatures.
water.	H ₂ O. Clear, tasteless, and odorless liquid essential to most plant and animal life. Compound of hydrogen and oxygen. Freezes at 32°F (0°C), boils at 212°F (100°C). Chemical compound may be termed hydrogen oxide. Can exist as a solid, liquid, or a gas, in solution or in suspension.
wave front.	The wave front is the capacity gradient that exists in the critical bed depth. It outlines the gradual transition of the carbon from "fresh" to "spent."
wetting point.	To insure effective utilization of the packing surface for gas/liquid contacts, it is imperative that the packing surface be wetted. For a given packed column operation, there is a minimum liquid flow required to produced approximate total wetting of the packing surface. This minimum liquid-flow rate is called the wetting point.

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Appendix E



APPENDIX E

LIST OF ABBREVIATIONS

A-280	New Jersey Assembly Bill No. 280
A-280 compound	Chemical compound regulated under A-280 law
a_t	Total surface area of packing per unit volume ($m^2 m^{-3}$)
a_w	Wetted area of packing per unit volume ($m^2 m^{-3}$)
BAT	Best available technology
BTGA	Best technology generally available
C(e)	Concentration of the contaminant in the effluent stream: the treatment objective (mcg/l)
C(i)	Concentration of the contaminant in the influent water (mcg/l)
CWS	Community water system
CWact	Actual weight of carbon selected for design (lb)
CWmin	Carbon weight - minimum required (lb GAC)
cm	Centimeter
cu ft	Cubic foot
cu m	Cubic meter
cu m/d	Cubic meters per day
cu m/s	Cubic meters per second
cu yd	Cubic yard
D_A	Diffusivity in air ($m^2 s^{-1}$)
D_w	Diffusivity in water ($m^2 s^{-1}$)
DWQI	(New Jersey) Drinking Water Quality Institute
Den	GAC density (lb/cu ft)
d_s	Diameter of sphere with same surface area as a piece of packing material (m)
EBCTact	Actual empty bed contact time used for design

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(continued)

EBCT _{min}	Minimum acceptable empty bed contact time (min)
FS	Factor of safety
ft	Foot
G	Air loading ($m^3 m^{-2} sec^{-1}$)
GAC	Granular activated carbon
gal	Gallon
gpd	Gallons per day
gpd/sq ft	Gallons per day per square foot
gpm	Gallons per minute
H	Henry's Law Constant of contaminant ("dimensionless")
HTU	Height of transfer unit
hr	Hours
K	Compound specific constant in Freundlich equation (mg contam./g GAC)
$K_L a$	The overall mass transfer coefficient (sec^{-1})
k_g	Air phase mass transfer coefficient ($Kg Mole m^{-2} atm^{-1} sec^{-1}$)
k_l	Liquid phase mass transfer coefficient ($m sec^{-1}$)
kw-hr	Kilowatt-hour
L	Liquid loading ($m^3 m^{-2} sec^{-1}$)
LOQ	Limit of quantitation
l	Liter
lb	Pound
lbm	Pounds mass
lpd	Liters per day
lpd/cu m	Liters per day per cubic meter

APPENDIX E
(continued)C

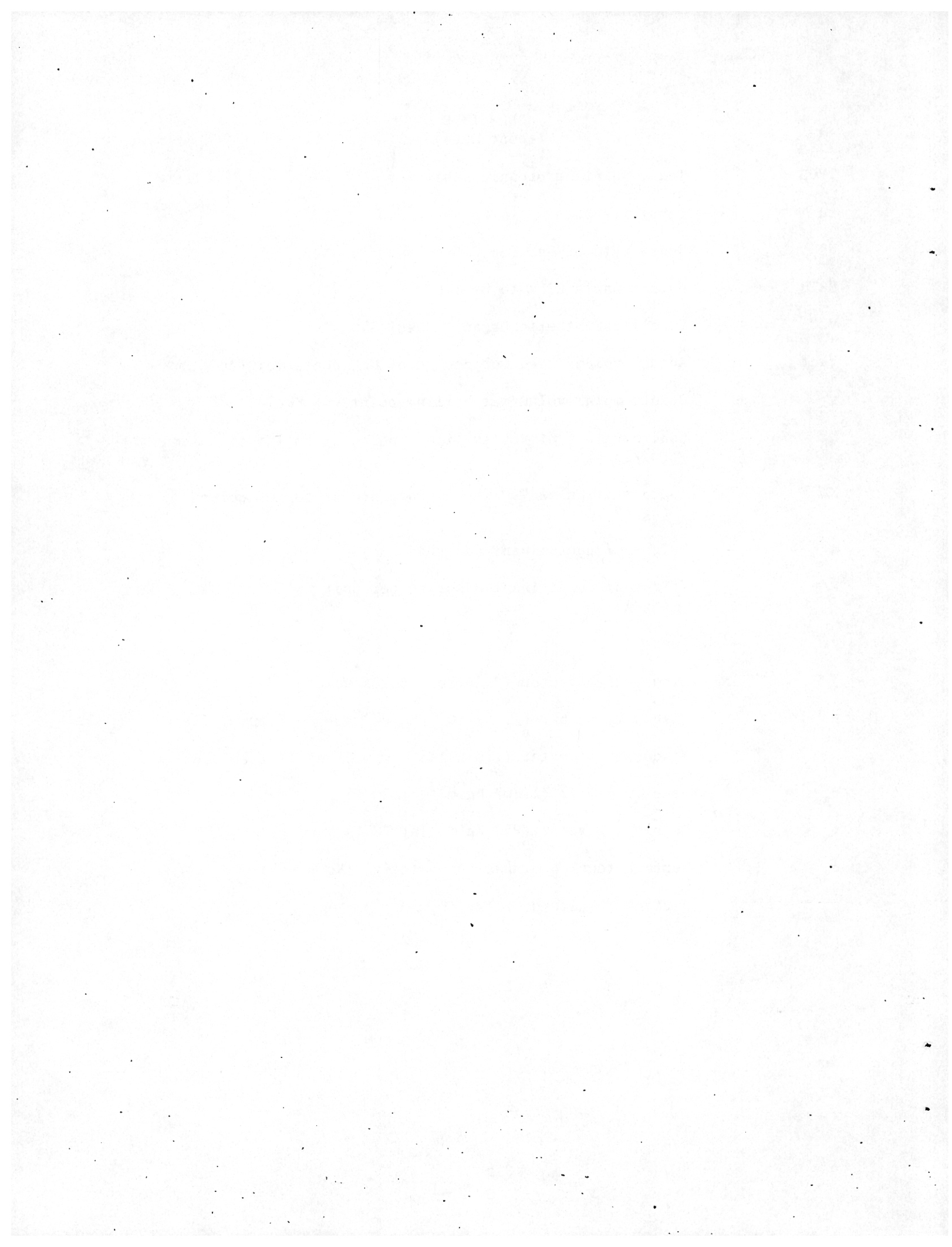
lpm/sq m	Liters per minute per square meter
lps	Liters per second
M_A	Molecular weight of air (29 Kg Kmol^{-1})
M_w	Molecular weight of water (18.2 Kg Kmol^{-1})
MCL	Maximum contaminant level (expressed as mg/l) [1,000 micrograms (mcg) = 1 milligram (mg)]
MCLG	Maximum contaminant level goal
MDL	Method detection limit
MEK	Methyl ethyl ketone
MW	Molecular weight
m	Meter
m	Weight of GAC (g)
mcg/l	Micrograms per liter
mgd	Million gallons per day
mg/l	Milligrams per liter
min	Minutes
mm	Millimeter
N_F	Froude number (dimensionless)
N_R	Reynolds number (dimensionless)
N_W	Weber number (dimensionless)
NIPDWR	National Interim Primary Drinking Water Regulation
NJAC	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NJSDWA	New Jersey Safe Drinking Water Act
NPDWR	National Primary Drinking Water Regulation
NTNCWS	Non-transient Non-community Water System

APPENDIX E
(continued)

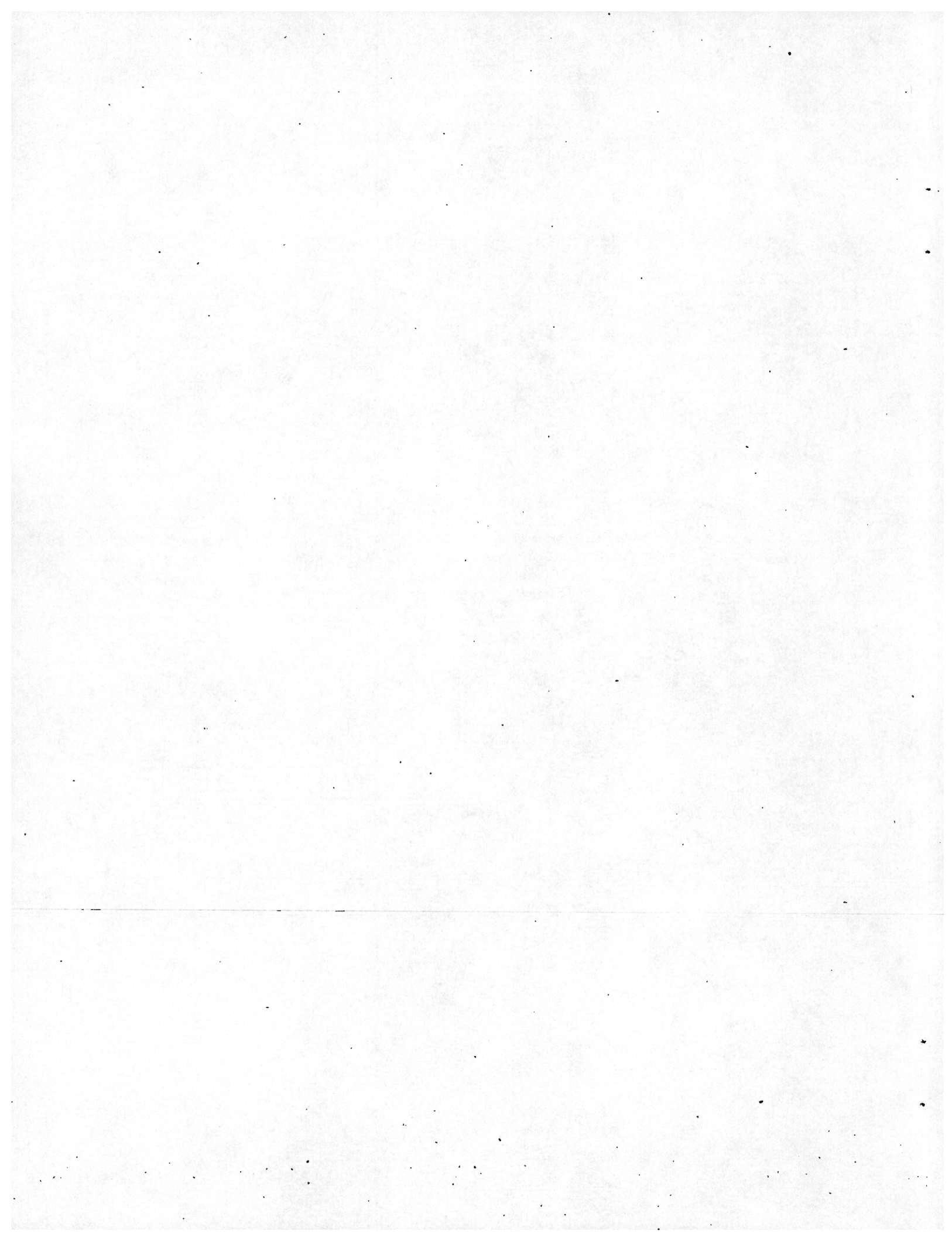
NTU	Number of transfer units
n	Compound specific constant in Freundlich equation (dimensionless)
ntu	Nephelometric turbidity unit
P_t	Operating pressure of column (= 1 atm)
PAC	Powdered activated carbon
POE	Point-of-Entry Technologies
POU	Point-of-Use Technologies
PQL	Practical Quantitation Level
PTA	Packed Tower Aeration
PWS	Public Water System
PWSS	Public Water System Supervision
ppb	Parts per billion
ppm	Parts per million
psi	Pounds per square inch
Q	Water flow rate (mgd)
q	Same as x/m
R	Stripping factor (dimensionless)
RMCL	Recommended Maximum Contaminant Level
SDWA	Safe Drinking Water Act, or the "ACT," as amended in 1986
SF_K	Safety factor on $K_L a$
sq ft	Square foot
sq m	Square meter
T	Temperature of the water ($^{\circ}K$)
THM	Trihalomethane
TTHMFP	Total trihalomethane formation potential

APPENDIX E
(continued)

TVOS	Toxic volatile organic substance
tu	Turbidity unit
UR	Usage rate of GAC (lb GAC/gal water)
URTH	Unreasonable Risk to Health
VOC	Volatile Synthetic Organic Chemical
Vact	Actual volume used for design of GAC contactor (cu ft)
v_c	Solute molal volume at boiling point ($m^3 \text{ Kmol}^{-1}$)
X_B	Concentration of VOC in liquid phase at bottom of column (ug/l)
X_T	Concentration of VOC in liquid phase at top of column (ug/l)
x	Weight of contaminant adsorbed (mg)
x/m	Weight of contaminant adsorbed per unit weight of GAC (mg/g)
yr	Year
Ψ	Association factor (2.26 to 2.6 for water)
μ_A	Viscosity of air ($1.9 \times 10^{-5} \text{ Kg m}^{-1} \text{ sec}^{-1}$ at 20°C)
μ_w	Viscosity of water ($1.0 \times 10^{-3} \text{ Kg m}^{-1} \text{ sec}^{-1}$ at 20°C)
ρ_A	Density of air (1.207 Kg m^{-3} at 20°C)
ρ_w	Density of water (998 Kg m^{-3} at 20°C)
σ_c	Surface tension of packing material (Kg sec^{-2})
σ_w	Surface tension of water (Kg sec^{-2})
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Appendix E



APPENDIX F

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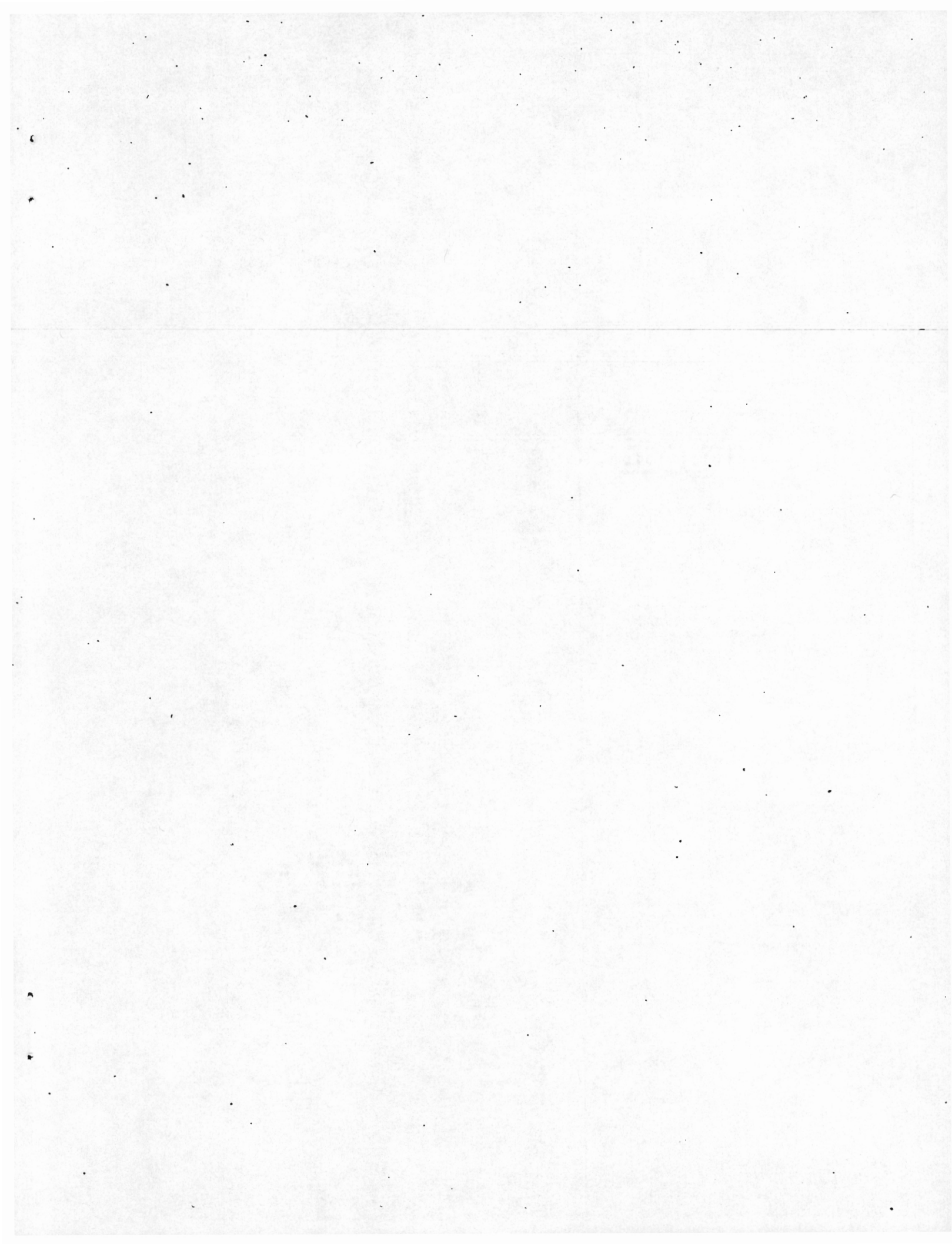
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Appendix G



APPENDIX G

SUPPLEMENTAL INTERIM REPORTS PRODUCED UNDER
THE SPECIAL WATER TREATMENT STUDY - PHASE II*

- Task 2: Water Quality Report on Data Collection and Organization
- Task 3: Water Treatment Plant Sampling Manual
- Analysis and Presentation of Results of the First Round Sampling Program
- Analysis and Presentation of Results of the Second Round Sampling Program
- Task 4: Surrogate Parameters
- Summary of State Water Quality Regulations and Standards
- Task 5: Technology Evaluation Interim Report
- Task 8: Non-Public Water Supplies
- Task 9: Technical Information Pamphlets:
- Packed Column Air Stripping
Granular Activated Carbon Adsorption
- Task 10: Biological Monitoring

*Available from NJDEP Division of Water Resources

