

APPENDICES

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APPENDIX A

Minimum Performance Standards for Discharges to the Delaware Estuary

TABLE 1: Minimum Performance Standards for Organic Compounds for Discharges from Industrial and Municipal Wastewater Treatment Facilities on the Delaware River Estuary.

PARAMETER	LONG-TERM AVERAGE CONCENTRATION ^a (µg/l)
Acrolein	50 ^b
Acrylonitrile	96
Benzene	37
Bromoform	29 ^b
Carbon tetrachloride	18
Chlorobenzene	15
Chlorodibromomethane	7 ^b
Chloroform	21
Dichlorobromomethane	6 ^b
1,2 - Dichloroethane	68
1,1 - Dichloroethene	16
Ethylbenzene	32
Methyl bromide	20 ^b
Methylene chloride	40
Tetrachloroethene	22
Toluene	26
1,2 - trans-Dichloroethene	21
1,1,2,2 - Tetrachloroethane	3 ^b
1,1,1 - Trichloroethane	21
1,1,2 - Trichloroethane	21
Trichloroethene	21
Vinyl chloride	104
Acenaphthene	22
Anthracene	22
Benzo[a]anthracene	22
Benzo[a]pyrene	23
Benzo[b]fluoranthene	23
Benzo[k]fluoranthene	22
Bis (2-chloroisopropyl) ether	301 ^b

PARAMETER	LONG-TERM AVERAGE CONCENTRATION^a (µg/l)
Bis (2-ethylhexyl) phthalate	103
Butyl benzyl phthalate	12 ^b
Chrysene	22
Dibenzo[a,h]anthracene	10 ^b
1,2 - Dichlorobenzene	77
1,3 - Dichlorobenzene	31
1,4 - Dichlorobenzene	15
Diethyl phthalate	81
Dimethyl phthalate	19
Di-N-butyl phthalate	27
2,4 - Dinitrotoluene	113
2,6 - Dinitrotoluene	255
Fluoranthene	25
Fluorene	22
Hexachlorobenzene	15
Hexachlorobutadiene	20
Hexachloroethane	21
Indeno[1,2,3-cd]pyrene	0.017 ^b
Isophorone	10 ^b
Nitrobenzene	27
N-Nitrosodimethylamine	73 ^b
N-Nitrosodiphenylamine	3.8 ^b
Phenanthrene	22
Pyrene	25
2 - Chlorophenol	31
2,4 - Dichlorophenol	39
2,4 - Dimethylphenol	18
2,4 - Dinitrophenol	71
Phenol	15

^a Except as noted, source is BAT Effluent limitation Guidelines for the Organic Chemicals, Plastics and Synthetic Fibers Category, 40 CFR Part 414.91.

^b Highest reported value for activated sludge treatment in the U.S. EPA's Water Engineering Research Laboratory treatability data base.

TABLE 2: Minimum Performance Standards for Chlorinated Pesticides and PCBs for Discharges from Industrial and Municipal Wastewater Treatment Facilities on the Delaware River Estuary.

PARAMETER	LONG-TERM AVERAGE CONCENTRATION ($\mu\text{g/l}$)
Aldrin	0.19
Alpha - BHC	0.20
Beta - BHC	2.60
Gamma - BHC (Lindane)	1.40
Chlordane	2.25
4,4' - DDT	0.06 ^b
4,4' - DDE	0.07
4,4' - DDD	0.50
Dieldrin	0.03 ^b
Endosulfan	0.09
Endrin	0.42
Heptachlor	0.60
Heptachlor epoxide	0.40 ^b
PCBs (Total)	0.50 ^b
Toxaphene	1.00 ^b

^b Based upon the Practical Quantitation Limit (PQL).

TABLE 3: Minimum Performance Standards for Total Recoverable Metals for Discharges from Industrial Wastewater Treatment Facilities on the Delaware River Estuary.

PARAMETER	LONG-TERM AVERAGE CONCENTRATION (µg/l)
Aluminum	850.0
Arsenic	10.0
Cadmium	6.0
Chromium (Total)	52.0
Copper	50.0
Lead	37.0
Mercury	2.3
Nickel	80.0
Selenium	15.0
Silver	22.0
Zinc	94.0

TABLE 4: Minimum Performance Standards for Total Recoverable Metals for Discharges from Municipal Wastewater Treatment Facilities on the Delaware River Estuary.

PARAMETER	LONG-TERM AVERAGE CONCENTRATION (µg/l)
Aluminum	300.0
Arsenic	13.0
Cadmium	8.0
Chromium (Total)	39.0
Copper	39.0
Lead	34.0
Mercury	0.8
Nickel	47.0
Selenium	9.0
Silver	21.0
Zinc	65.0

APPENDIX B

Water Quality Criteria for Toxic Pollutants for the Delaware River Estuary (February 1995)

TABLE 5: Water Quality Criteria for Toxic Pollutants for the Protection of Aquatic Life in the Delaware River Estuary.

Parameter	Freshwater Criteria (µg/l)		Marine Criteria (µg/l)	
	Acute	Chronic	Acute	Chronic
Metals				
Aluminum	750	87	-	-
Arsenic (trivalent)	360	190	69	36
Cadmium	$e^{(1.128 \cdot \text{LN}(\text{Hardness}) - 3.828)}$	$e^{(0.7852 \cdot \text{LN}(\text{Hardness}) - 3.49)}$	43	9.3
Chromium (trivalent)	$e^{(0.8190 \cdot \text{LN}(\text{Hardness}) + 3.688)}$	$e^{(0.8190 \cdot \text{LN}(\text{Hardness}) + 1.561)}$	-	-
Chromium (hexavalent)	16	11	1,100	50
Copper	$e^{(0.9422 \cdot \text{LN}(\text{Hardness}) - 1.464)}$	$e^{(0.8545 \cdot \text{LN}(\text{Hardness}) - 1.465)}$	2.9	2.9
Cyanide (total)	22	5.2	1.0	-
Lead	$e^{(1.273 \cdot \text{LN}(\text{Hardness}) - 1.460)}$	$e^{(1.273 \cdot \text{LN}(\text{Hardness}) - 4.705)}$	220	8.5
Mercury	2.4	0.012	2.1	0.025
Nickel	$e^{(0.846 \cdot \text{LN}(\text{Hardness}) + 3.3612)}$	$e^{(0.846 \cdot \text{LN}(\text{Hardness}) + 1.1645)}$	75	8.3
Selenium	20	5.0	300	71
Silver	$e^{(1.72 \cdot \text{LN}(\text{Hardness}) - 6.52)}$	-	2.3	-
Zinc	$e^{(0.8473 \cdot \text{LN}(\text{Hardness}) + 0.8604)}$	$e^{(0.8473 \cdot \text{LN}(\text{Hardness}) + 0.7614)}$	95	86
Pesticides/PCBs				
Aldrin	1.5	-	0.65	-
gamma - BHC (Lindane)	1.0	0.08	0.08	-
Chlordane	1.2	0.0043	0.045	0.004
Chlorpyrifos (Dursban)	0.083	0.041	0.011	0.0056
DDT and metabolites (DDE & DDD)	0.55	0.001	0.065	0.001
Dieldrin	1.25	0.0019	0.355	0.0019
Endosulfan	0.11	0.056	0.017	0.0087
Endrin	0.09	0.0023	0.019	0.0023
Heptachlor	0.26	0.0038	0.027	0.0036
PCBs (Total)	2.0	0.014	10.0	0.03
Parathion	0.065	0.013	-	-
Toxaphene	0.73	0.0002	0.21	0.0002
Acid Extractable Organics				
Pentachlorophenol	$e^{(1.005 \cdot \text{pH} - 4.83)}$	$e^{(1.005 \cdot \text{pH} - 5.29)}$	13	7.9
Indicator Parameters				
Whole Effluent Toxicity	0.3 Toxic Units _{acute}	1.0 Toxic Units _{chronic}	0.3 TU _a	1.0 TU _c

TABLE 6: Water Quality Criteria for Carcinogens for the Delaware River Estuary.

PARAMETER	EPA CLASS.	FRESHWATER CRITERIA ($\mu\text{g/l}$)		MARINE CRITERIA ($\mu\text{g/l}$)
		FISH & WATER INGESTION	FISH INGESTION ONLY	FISH INGESTION ONLY
Arsenic*	A	0.018	0.144	0.0253
Beryllium	B2	0.00767	0.132	0.0232
Aldrin	B2	0.00189	0.0226	0.00397
alpha - BHC	B2	0.00391	0.0132	0.00231
Chlordane	B2	0.000575	0.000588	0.000104
DDT	B2	0.000588	0.000591	0.000104
DDE	B2	0.00554	0.00585	0.00103
DDD	B2	0.00423	0.00436	0.000765
Dieldrin	B2	0.000135	0.000144	0.0000253
Heptachlor	B2	0.000208	0.000214	0.0000375
Heptachlor epoxide	B2	0.000198	0.000208	0.0000366
PCBs (Total)	B2	0.0000444	0.0000448	0.0000079
Toxaphene	B2	0.000730	0.000747	0.000131
Acrylonitrile	B1	0.0591	0.665	0.117
Benzene	A	1.19	71.3	12.5
Bromoform	B2	4.31	164.0	28.9
Bromodichloromethane	B2	0.559	55.7	9.78
Carbon tetrachloride	B2	0.254	4.42	0.776
Chlorodibromomethane	C	0.411	27.8	4.88
Chloroform	B2	5.67	471.0	82.7
1,2 - Dichloroethane	B2	0.383	98.6	17.3
1,1 - Dichloroethene	C	0.0573	3.20	0.562
1,3 - Dichloropropene**	B2	87.0	14.1	2.48

PARAMETER	EPA CLASS.	FRESHWATER CRITERIA ($\mu\text{g/l}$)		MARINE CRITERIA ($\mu\text{g/l}$)
		FISH & WATER INGESTION	FISH INGESTION ONLY	FISH INGESTION ONLY
Methylene chloride	B2	4.65	1,580	277
Tetrachloroethene**	B2	0.80	8.85	1.55
1,1,1,2 - Tetrachloroethane	C	1.29	29.3	5.15
1,1,2,2 - Tetrachloroethane	C	0.172	10.8	1.89
1,1,2 - Trichloroethane	C	0.605	41.6	7.31
Trichloroethene**	B2	2.70	80.7	14.2
Vinyl chloride**	A	2.00	525.0	92.9
Benzidine	A	0.000118	0.000535	0.000094
3,3 - Dichlorobenzidine	B2	0.0386	0.0767	0.0135
PAHs				
Benz[a]anthracene	B2	0.00171	0.00177	0.00031
Benzo[b]fluoranthene	B2	0.000455	0.000460	0.000081
Benzo[k]fluoranthene	B2	0.000280	0.000282	0.000049
Benzo[a]pyrene	B2	0.0000644	0.0000653	0.0000115
Chrysene	B2	0.0214	0.0224	0.00394
Dibenz[a,h]anthracene	B2	0.0000552	0.0000559	0.0000098
Indeno[1,2,3-cd]pyrene	B2	0.0000576	0.0000576	0.0000101
Bis (2-chloroethyl) ether	B2	0.0311	1.42	0.249
Bis (2-ethylhexyl) phthalate	B2	1.76	5.92	1.04
Dinitrotoluene mixture (2,4 & 2,6)	B2	17.3	1420	249
1,2 - Diphenylhydrazine	B2	0.0405	0.541	0.095
Hexachlorobenzene	B2	0.000748	0.000775	0.000136
Hexachlorobutadiene	C	0.445	49.7	8.72
Hexachloroethane	C	1.95	8.85	1.56
Isophorone	C	36.3	2590	455
N-Nitrosodi-N-methylamine	B2	0.000686	8.12	1.43

PARAMETER	EPA CLASS.	FRESHWATER CRITERIA ($\mu\text{g/l}$)		MARINE CRITERIA ($\mu\text{g/l}$)
		FISH & WATER INGESTION	FISH INGESTION ONLY	FISH INGESTION ONLY
N-Nitrosodi-N-phenylamine	B2	4.95	16.2	2.84
N-Nitrosodi-N-propylamine	B2	0.00498	1.51	0.265
Pentachlorophenol	B2	0.282	8.16	1.43
2,4,6 - Trichlorophenol	B2	2.14	6.53	1.15
Dioxin (2,3,7,8 - TCDD)**	-	1.3×10^{-8}	1.4×10^{-8}	2.4×10^{-9}

* National criteria obtained from the Federal Register, Vol. 57, No. 246, pages 60848 - 60923).

** Criteria obtained from or calculated from data contained in the Water Quality Criteria documents for the parameter.

TABLE 7: Water Quality Criteria for Systemic Toxicants for the Delaware River Estuary.

PARAMETER	EPA CLASS.	FRESHWATER CRITERIA ($\mu\text{g/l}$)		MARINE CRITERIA ($\mu\text{g/l}$)
		FISH & WATER INGESTION	FISH INGESTION ONLY	FISH INGESTION ONLY
Antimony		14.0	4,310	757
Arsenic	A	9.19	73.4	12.9
Beryllium	B2	165	2,830	498
Cadmium		14.5	84.1	14.8
Chromium (Trivalent)		33,000	673,000	118,000
Hexavalent chromium	A	166	3,370	591
Mercury	D	0.530	0.560	0.144
Nickel		607	4,580	805
Selenium	D	100	2,020	355
Silver	D	175	108,000	18,900
Thallium		1.70	6.20	1.10
Zinc		9110	68700	12100
Aldrin	B2	0.96	11.5	2.03
gamma - BHC (Lindane)		7.38	24.9	4.37
Chlordane	B2	0.0448	0.0458	0.00805
DDT	B2	0.100	0.100	0.0176
Dieldrin	B2	0.108	0.115	0.020
Endosulfan		111	239	42.0
Endrin	D	0.755	0.814	0.143
Heptachlor	B2	0.337	0.344	0.060
Heptachlor epoxide	B2	0.0234	0.0246	0.00433
Total PCBs	B2	0.00839	0.00849	0.00149
Acrolein		320	780	137

PARAMETER	EPA CLASS.	FRESHWATER CRITERIA ($\mu\text{g/l}$)		MARINE CRITERIA ($\mu\text{g/l}$)
		FISH & WATER INGESTION	FISH INGESTION ONLY	FISH INGESTION ONLY
Ethylbenzene		3,120	28,700	5,050
Bromoform	B2	682	25,900	4,560
Bromodichloromethane	B2	693	69,000	12,100
Dibromochloromethane	C	690	46,600	8,190
Carbon tetrachloride	B2	23.1	402	70.6
Chloroform	B2	346	28,700	5,050
Chlorobenzene	D	677	20,900	3,670
1,1 - Dichloroethene	C	309	17,300	3,040
1,2 - trans - Dichloroethene		696	136,000	23,900
1,3 - Dichloropropene	B2	10.4	1,690	297
Methyl bromide		49.0	N/A	N/A
Methylene chloride	B2	2,090	710,000	125,000
1,1,2 - Trichloroethane	C	138	9,490	1,670
Tetrachloroethene		318	3,520	618
1,1,1,2 - Tetrachloroethane	C	1,000	22,400	3,940
Toluene		6,760	201,000	35,400
Acenaphthene		1,180	2,670	469
Anthracene	D	4,110*	6,760*	1,190*
Benzidine	A	81.8	369	64.9
Bis (2-chloroisopropyl) ether		1,390	174,000	30,600
Bis (2-ethylhexyl) phthalate	B2	492*	1,660*	291
Butylbenzyl phthalate**	C	2,980	5,200	914
Diethyl phthalate	D	22,600	118,000	20,700
Dimethyl phthalate	D	313,000	2,990,000	526,000
Dibutyl phthalate	D	2,710	12,100	2,130
1,2 - Dichlorobenzene	D	2,670	17,400	3,060

PARAMETER	EPA CLASS.	FRESHWATER CRITERIA ($\mu\text{g/l}$)		MARINE CRITERIA ($\mu\text{g/l}$)
		FISH & WATER INGESTION	FISH INGESTION ONLY	FISH INGESTION ONLY
1,3 - Dichlorobenzene	D	414	3,510	617
1,4 - Dichlorobenzene		419	3,870	677
2,4 - Dinitrotoluene		69.2	5670	996
Fluoranthene		296*	375*	65.8
Fluorene	D	730	1,530	268
Hexachlorobenzene	B2	0.958	0.991	0.174
Hexachlorobutadiene	C	69.4	7,750*	1,360
Hexachlorocyclopentadiene		242	17,400*	3,050*
Hexachloroethane	C	27.3	124	21.7
Isophorone	C	6,900	492,000	86,400
Nitrobenzene	D	17.3	1,860	327
Pyrene	D	228*	291*	51.1
1,2,4 - Trichlorobenzene	D	255	945	166
2 - Chlorophenol		122	402	70.6
2,4 - Dichlorophenol		92.7	794	139
2,4 - Dimethylphenol		536	2,300	403
2,4 - Dinitrophenol		70	14,300	2,500
Pentachlorophenol	B2	1,010	29,400*	5,160
Phenol		20,900	4,620,000	811,000

* Recommended criterion is above the solubility of the compound in water at 25° C.

** Recommended criteria incorporate an additional safety factor of 10 since this compound is a Class "C" carcinogen and no criteria to protect against carcinogenic effects is recommended due to lack of data.

APPENDIX C

Design Flows for Wasteload Allocations

TABLE 8: Design Effluent Flows for Delaware Estuary Industrial Discharges.

PERMITTEE	NPDES #	DSN	PRODUCTION -BASED FLOW (MGD)	1992 MAXIMUM MONTHLY FLOW (MGD)	1988-1992 MAXIMUM ANNUAL FLOW (MGD)	EFFLUENT DESIGN FLOW (m ³ /s)
STAR ENTERPRISES	DE0000256	001		402.0	320.0	17.608
STAR ENTERPRISES	DE0000256	601		9.80	10.77	0.472
FORMOSA PLASTICS	DE0000612	001		0.54	0.46	0.024
GEORGIA GULF	DE0000647	001		0.23	0.29	0.013
STANDARD CHLORINE	DE0020001	001		0.49	0.48	0.022
OCCIDENTAL CHEMICAL	DE0050911	001		0.30	0.23	0.013
DUPONT - CHAMBERS WORKS	NJ0005100	001		49.70	66.65	2.919
DUPONT - CHAMBERS WORKS	NJ0005100	009		0.03	0.03	0.001
DUPONT - CHAMBERS WORKS	NJ0005100	011		0.03	0.03	0.001
DUPONT - CHAMBERS WORKS	NJ0005100	013		9.80	-	0.429
DUPONT - CHAMBERS WORKS	NJ0005100	661		27.90	-	1.222
DUPONT-EDGEMOOR	DE0000051	001		4.30	4.13	0.188
DUPONT - CHERRY ISLAND	DE0050644	001		0.25	0.19	0.011
IKO MANUFACTURING	DE0050857	001		0.014	0.015	0.001
GENERAL CHEMICAL CORPORATION	DE0000655	001		30.10	26.62	1.318
B.F. GOODRICH	NJ0004286	001		0.91	0.95	0.042
MONSANTO	NJ0005045	001		1.19	0.95	0.052
BP OIL	PA0012637	001		57.15	-	2.503
BP OIL	PA0012637	201		3.31	-	0.145
PQ CORP.	PA0013021	001		0.235	-	0.010
NORTH AMERICAN SILICA	PA0051713	001		0.404	-	0.018
ROLLINS ENVIRONMENTAL	NJ0005240	001		0.27	0.22	0.012
BOEING HELICOPTERS	PA0013323	001		1.04	-	0.046
BOEING HELICOPTERS	PA0013323	002		0.072	-	0.003
DUPONT - REPAUNO	NJ0004219	001		31.30	20.25	1.371
AIR PRODUCTS & CHEMICALS	NJ0004278	001		0.18	0.1565	0.008
HERCULES - GIBBSTOWN	NJ0005134	001		0.32	0.3019	0.014
MOBIL OIL	NJ0005029	001		10.19	11.54	0.506
PENNWALT	NJ0005185	001		0.72	0.67	0.032
DEPT. OF NAVY	PA0036455	005		1.009	-	0.044
DEPT. OF NAVY	PA0036455	006		2.616	-	0.115

PERMITTEE	NPDES #	DSN	PRODUCTION -BASED FLOW (MGD)	1992 MAXIMUM MONTHLY FLOW (MGD)	1988-1992 MAXIMUM ANNUAL FLOW (MGD)	EFFLUENT DESIGN FLOW (m ³ /s)
DEPT. OF NAVY	PA0036455	007		8.21	-	0.360
CHEVRON	PA0011533	015		9.13	8.15	0.400
SUN REFINING & MARKETING	PA0012629	002		3.75	3.21	0.164
PHILADELPHIA GAS - PASSYUNK	PA0046876	001		1.211	-	0.053
COASTAL EAGLE POINT	NJ0005401	001		3.90	3.6	0.171
MCANDREWS AND FORBES	NJ0004090	001		0.36	-	0.016
GEORGIA PACIFIC	NJ0004669	001		0.30	0.20	0.013
PHILADELPHIA GAS - RICHMOND	PA0012882	004		21.893	-	0.959
ALLIED-SIGNAL	PA0012017	001		0.028	-	0.001
ROHM & HAAS - PHILADELPHIA	PA0012777	001		5.62	4.51	0.246
ROHM & HAAS - PHILADELPHIA	PA0012777	003		1.67	1.34	0.073
ROHM & HAAS - PHILADELPHIA	PA0012777	004		1.96	1.58	0.086
ROHM & HAAS - PHILADELPHIA	PA0012777	005		0.83	0.61	0.036
ROHM & HAAS - PHILADELPHIA	PA0012777	007		0.64	0.51	0.028
OCCIDENTAL CHEMICAL	NJ0004391	001C		0.31	0.29	0.014
ROHM & HAAS - BRISTOL	PA0012769	009		1.78	1.57	0.078
HERCULES - BURLINGTON	NJ0005142	001		0.04	-	0.002
USX	PA0013463	005		21	26	1.139
USX	PA0013463	103		6.90	57.42	2.515
G.R.O.W.S.	PA0043818	001		0.067	-	0.003
PRE-FINISH METALS	PA0045021	001		0.214	-	0.009
RHONE-POULENC BASIC CHEMICALS	PA0011720	001		0.072	-	0.003

TABLE 9: Design Effluent Flows for Delaware Estuary Municipal Discharges.

PERMITTEE	NPDES #	DSN	GROWTH FACTOR (%)	DESIGN CAPACITY (MGD)	1990 - 1992 AVERAGE ANNUAL FLOW (MGD)	EFFLUENT DESIGN FLOW (m³/s)
PORT PENN STP	DE0021539	001	5%	0.05	0.02	0.002
CITY OF SALEM	NJ0024856	001	5%	1.40	0.84	0.061
DELAWARE CITY STP	DE0021555	001	5%	0.55	0.39	0.024
PENNSVILLE SEWAGE AUTHORITY	NJ0021598	001	5%	1.875	1.59	0.082
CARNEYS PT. SEWAGE AUTHORITY	NJ0021601	001	5%	1.30	0.82	0.057
CITY OF WILMINGTON	DE0020320	001	5%	90.0	90.87	3.942
PENNS GROVE SEWAGE AUTHORITY	NJ0024023	001	5%	0.75	0.66	0.033
LOGAN TOWNSHIP MUA	NJ0027545	001	5%	1.00	0.59	0.044
DELCORA	PA0027103	001	5%	44.00	37.76	1.927
TINICUM TOWNSHIP	PA0028380	001	5%	1.40	0.98	0.061
GREENWICH TOWNSHIP	NJ0030333	001	5%	1.00	0.57	0.044
GLOUCESTER COUNTY UA	NJ0024686	001	5%	20.10	17.55	0.880
PHILADELPHIA - SOUTHWEST STP	PA0026671	001	5%	200.00	213.20	8.760
CAMDEN COUNTY MUA	NJ0026182	001	5%	80.00	52.95	3.504
PHILADELPHIA - SOUTHEAST STP	PA0026662	001	5%	112.00	117.46	4.906
PHILADELPHIA - NORTHEAST STP	PA0026689	001	5%	210.00	221.25	9.691
PALMYRA BOROUGH	NJ0024449	001	5%	1.05	0.57	0.046
RIVERTON BOROUGH	NJ0021610	001	5%	0.22	0.20	0.010
CINNAMINSON	NJ0024007	001	5%	2.00	1.52	0.088
DELTRAN SEWAGE AUTHORITY	NJ0023507	001	5%	1.50	1.58	0.066
RIVERSIDE SEWAGE AUTHORITY	NJ0022519	001	5%	1.00	1.04	0.044
BEVERLY SEWAGE AUTHORITY	NJ0027481	001	5%	1.00	0.56	0.044
BURLINGTON TOWNSHIP	NJ0021709	001	5%	1.65	1.09	0.072
CITY OF BURLINGTON	NJ0024660	001	5%	3.20	1.70	0.140
BRISTOL TOWNSHIP	PA0026450	001	5%	2.25	1.67	0.099
BRISTOL BOROUGH	PA0027294	001	5%	2.70	2.44	0.118
LOWER BUCKS COUNTY JMUA	PA0026468	001	5%	10.00	8.38	0.438
HAMILTON TOWNSHIP	NJ0026301	001	5%	16.00	10.42	0.701
CITY OF TRENTON	NJ0020923	001	5%	20.00	17.28	0.876
MORRISVILLE BOROUGH	PA0026701	001	5%	7.10	4.14	0.311

TABLE 10: Design Freshwater Flows for the period 1970 to 1990 for the Delaware River at Trenton and Tributaries to the Estuary.

LOCATION	7Q10		30Q5		Harmonic Mean Flow	
	CFS	CMS	CFS	CMS	CFS	CMS
Delaware River at Trenton	-	-	3017.0	85.43	7402.0	209.60
Schuylkill River at Philadelphia ¹	98.00	2.78	322.9	9.14	1309.4	37.08
Brandywine Creek at Wilmington	95.01	2.69	127.39	3.61	306.36	8.68
Christina River ²	35.98	1.02	54.29	1.54	127.33	3.61
Christina River at Coochs Bridge	1.68	0.05	3.79	0.11	9.67	0.27
Little Mill Creek at Elsmere ³	0.45	0.01	1.38	0.04	3.18	0.09
Red Clay Creek at Wooddale	12.66	0.36	17.83	0.50	41.13	1.16
White Clay Creek near Newark	21.19	0.60	31.29	0.89	73.35	2.08
Salem River at Woodstown	1.26	0.04	4.15	0.12	9.35	0.26
Darby Creek at Waterloo Mills	1.64	0.05	2.58	0.07	5.19	0.15
Raccoon Creek	9.23	0.26	12.55	0.36	26.66	0.75
Cooper River	9.87	0.28	14.44	0.41	24.75	0.70
South Br. Pennsauken Cr. at Cherry Hill	3.73	0.11	5.30	0.15	9.58	0.27
Rancocas Creek ²	46.07	1.30	66.60	1.89	167.75	4.75
South Br. Rancocas Creek at Vincentown ⁴	8.40	0.24	14.72	0.42	46.03	1.30
North Br. Rancocas Creek at Pemberton	37.67	1.07	51.88	1.47	121.72	3.45
Neshaminy Cr.	19.65	0.56	35.66	1.01	107.82	3.05
Crosswicks Creek	27.92	0.79	38.98	1.10	86.56	2.45

¹ Values were determined by subtracting the average daily withdrawal by the City of Philadelphia (255 cfs) from the gage values. The 7Q10 value was recommended by the Pennsylvania Department of Environmental Resources.

² Sum of data from stations listed below.

³ Gage terminated in 1981. Value includes data from 1970 - 1980.

⁴ Available period of record: 1962 - 1975.

APPENDIX D

Water Quality Criteria for Protection from Chronic Effects for Six Metals for the Delaware River Estuary

TABLE 11: Numerical Values for Chronic Aquatic Life Freshwater Criteria for Six Metals for the Delaware River Estuary.

Parameter	Water Quality Criterion ($\mu\text{g/l}$)
Cadmium	0.9
Chromium (Trivalent)	160
Copper	9.1
Lead	2.2
Nickel	120
Zinc	82