Appendix H

NPDES Monitoring Requirements

The Environmental Protection Agency (EPA) mandates that any discharge to a body of water must be permitted through the National Pollutant Discharge Elimination System (NPDES). The EPA and the Massachusetts Department of Environmental Protection (DEP) jointly issued a NPDES permit to MWRA for the Deer Island treatment plant and three CSO treatment facilities, Cottage Farm, Prison Point, and Somerville Marginal. MWRA also owns and operates three additional CSO facilities, Constitution Beach, Fox Point, and Commercial Point. The effluent from these three gravity CSO facilities discharges to the City of Boston sewer lines. Thus, the Boston Water and Sewer Commission (BWSC) NPDES permit allows for the ultimate discharge of the effluent from those facilities.

The limits set in the MWRA NPDES permit are limitations for secondary treatment plants. MWRA currently operates under court-ordered interim limits while the upgrade of the Deer Island secondary treatment plant is being completed. A new NPDES permit is expected to become effective in FY01.

In addition, MWRA, through the NPDES Pretreatment Program, monitors the influent quality of wastewater. Those monitoring results provide the basis for determining the adequacy of existing Local Limits to protect the treatment plants and Boston Harbor. Local Limits allow the discharge of toxic chemicals from industrial sources to be regulated. Current Local Limits were enacted in FY94 and, under the Pretreatment Program requirements, must be re-evaluated every five years.

MWRA not only monitors to comply with the NPDES requirements, but also has its own monitoring programs, including Plant Monitoring and Receiving Water Monitoring. These monitoring programs serve to assure appropriate control of discharges to the system, to assure the most cost-effective wastewater treatment while meeting water quality standards, and to assure the quality of life of the organisms and health of the animal communities living in the receiving bodies of water.

H.1 Permits and Compliance Order

H.1.a NPDES Permit

Under the NPDES permit, "in compliance with the provisions of the Clean Water Act, as amended, 33 U.S.C. ə 1251 et seq., and the Massachusetts Clean Water Act, as amended, Mass. Gen. Laws, ch. 21, ə 266-53, the MWRA is permitted to discharge from (MWRA Publicly Owned Treatment Works, CSO Treatment Facilities, and CSO Outfalls), in accordance with effluent limitations, monitoring limitations, and other conditions..."

Monitoring Requirements and Effluent Limitations: The NPDES permit establishes monitoring requirements for existing POTW outfalls as well as for CSO treatment facility outfalls. In addition, the permit mandates CSO outfall identification and receiving water monitoring. It also establishes numerical limitations for certain parameters as well as narrative limits for all authorized discharges.

Reporting Requirements: In addition to POTW and CSO monitoring requirements, the NPDES permit requires certain reports on the state of MWRA sewerage and operational systems. These include the Infiltration/Inflow Report, CSO Facilities and Systems Inspection, reports on operational upsets, Overflow Reports, Operations Bypass Reports, Monthly Discharge Monitoring Reports (DMRs), and reporting on the effects of discharges (Annual Bioaccumulation Study). Table H-1 presents a summary of the permit limits and monitoring requirements for POTWs while Table H-2 presents permit limits for CSOs.

H.1.b Court Order

MWRA also operates under a court order issued in June 1986. In addition to establishing interim discharge limits for the treatment plant, the court order established a schedule for MWRA to upgrade the sewerage system and treatment plant. Table H-3 summarizes the court-ordered interim limits for the Deer Island Treatment Plant.

Table H-1

NPDES PERMIT Effluent Limitations and Monitoring Requirements for POTW Outfalls Deer Island Treatment Plant			
Effluent Characteristic	Discharge Limitation		
	Average Monthly	Average Weekly	Maximum Daily
BOD	*	*	*
TSS	*	*	*
Settleable Solids	*	*	*
pH	Not less than 6.5 nor greater than 8.5 at any time to Boston Harbor, Quincy Bay, Hingham Bay, the Inner Harbor and the Mystic River.		
Fecal Coliform	*	*	*
Total Coliform	*	*	*
Chlorine, Total Residual	(1) The total chlorine residual and other toxic components of the effluent shall not result in any demonstrable harm to aquatic life or violate any state or federal water quality standard which has been or may be promulgated. Upon promulgation of any such standards, this permit may be modified in accordance with such standards. (2) The permitee shall minimize the use of chlorine, still maintaining adequate bacterial control.		
Oil and Grease of Petroleum Origin (also called TPH or PHC)	N/A	N/A	15 mg/L

* Court ordered interim limit applies to this parameter.

Table H-1 [cont.]

NPDES PERMIT Effluent Limitations and Monitoring Requirements for POTW Outfalls Deer Island Treatment Plant	
Effluent Characteristic	Discharge Limitation
NOEC[a]	10% or greater (10% or more of the sample is composed of effluent; remainder is dilution water)
	Chronic toxicity tests to establish the NOEC (No Observed Effect Concentration): Chronic toxicity tests on representative 24-hour composite samples of the discharge using each of the following organisms: (i) the sheepshead minnow, *Cyprinodon variegatus* (7-day tests to measure growth and survival); and (ii) the red marine alga, *Champia parvula* (multi-day tests to evaluate the effects on sexual reproduction).
NOAEL[b] and LC50[c]	Acute static toxicity tests to establish the NOAEL (No Observed Acute Effect Level) and LC50 of the effluent: 96-hour acute static toxicity tests on representative 24-hour composite samples of the discharge using one to five-day-old juvenile mysid shrimp, *Mysidopsis bahia*.
NOAEL	20% or greater (20% or more of the sample is composed of effluent)
Other Monitored Parameters	Pollutants listed in 40 CFR Part 122 Appendix D. (See Table K-3 of Appendix K in this report.)

[a] NOEC: No Observed Effect Concentration is the highest concentration of effluent to which organisms are exposed in a life cycle or partial life cycle test which has no adverse effects (on growth, survival and reproduction).

[b] NOAEL: No Observed Acute Effect Level is the highest concentration of effluent to which organisms are exposed in a short-term test in which at least 90% of the test organisms survive.

[c] LC50: the concentration of effluent in a sample that causes mortality in 50% of the test population at a specific time of observation.

Table H-2

NPDES PERMIT Effluent Limitations and Monitoring Requirements for CSO Treatment Facility Outfalls	
Characteristic	Discharge Limitation
pH	The pH of the effluent shall not be (1) less than 6.5 nor greater than 8.5 at any time to the Inner Harbor and Mystic River (2) less than 6.5 nor greater than 9.0 at any time to the Charles River
Fecal Coliform	(1) Maximum monthly geometric mean: 1000 col/100 mL (2) Not more than 10% of the total samples can exceed 2500 col/100 mL during any monthly sampling period.
Chlorine, Total Residual	(1) The total chlorine residual and other toxic components of the effluent shall not result in any demonstrable harm to aquatic life or violate any state or federal water quality standard which has been or may be promulgated. Upon promulgation of any such standard, this permit may be modified in accordance with such standard. (2) The permitee shall minimize the use of chlorine, still maintaining adequate bacterial control.
Other Monitored Parameters	
Rainfall/Precipitation	
Flow	
BOD[a]	
TSS[a]	
Settleable Solids	

[a] Report both influent and effluent results for this parameter.

Table H-2 [cont.]

NPDES PERMIT Effluent Limitations and Monitoring Requirements for CSO Treatment Facility Outfalls
NOAEL[b]
LC50[b]
Cadmium[c]
Chromium (Hexavalent)[c]
Copper[c]
Lead[c]
Mercury[c]
Nickel[c]
Zinc[c]
Chlorinated Hydrocarbons[c]
Ammonia Nitrogen[c]
Total Phosphorus[c]
Pesticides[c]
PAHs[c]
VOCs[c]

[b] Only required to be monitored in the first and fifth year of the permit. Has not been monitored since the permit expired.

[c] Only required to be monitored in the first and fifth year of the permit, although MWRA has been continually monitoring these parameters since the start of the permit.

Table H-3

COURT ORDERED SEWAGE TREATMENT PLANT INTERIM LIMITATIONS			
Effluent Characteristic	Effluent Limits Average Monthly	Maximum Daily	Percent Removal*
BOD	140 mg/L	200 mg/L	27%
TSS	110 mg/L	180 mg/L	38%
Settleable Solids	2.8 mL/L	N/A	N/A
Fecal Coliform	200 col/100 mL	N/A	N/A
Total Coliform	1000 col/100 mL	N/A	N/A
pH	The pH of the effluent shall not be less than 6.5 nor greater than 8.5 at any time unless these values are exceeded due to natural causes or as a result of approved modifications of treatment processes.		

* Percent Removal is based on a 12-month running average.

Table H-3 [cont.]

COURT ORDERED SEWAGE TREATMENT PLANT INTERIM LIMITATIONS	
Other Effluent Limitations	
Chlorine	The Authority shall minimize the use of chlorine consistent with maintaining adequate bacterial control.
Reduction of Suspended Solids	Volatile suspended solids shall be reduced through anaerobic digestion, with percentage reductions to be computed as a two month rolling average (50%).
Special Monitoring of Oil and Grease	The Authority shall separately measure the concentration of the following by means of a weekly grab sample: Influent oil and grease, effluent oil and grease, digester sludge influent oil and grease, and digester sludge effluent oil and grease.

H.2 Monitoring Programs

In FY00, MWRA conducted several monitoring programs. However, this report will present only the influent and effluent monitoring programs. The report will also include information on the "critical areas" in MWRA and community sewer systems that have historically discharged during and after heavy rainstorms. These "critical areas" were monitored and inspected as part of the NPDES monitoring program.

H.2.a Treatment Plant Monitoring Program

The Treatment Plant Monitoring Program has two main components: The Influent Monitoring Program and the Effluent Monitoring Program.

The Influent Monitoring Program characterizes the influent to the Deer Island Treatment Plant. Influent monitoring for conventional parameters, in addition to being mandated by the NPDES permit, is also necessary for process control. Data from the Influent Monitoring Program provide

influent loading rates and the basis for determining treatment plant efficiency. In addition, influent monitoring for non-conventional parameters is mandated by the NPDES Permit Pretreatment Program.

The Effluent Monitoring Program characterizes the quality of the effluent discharged to a receiving body of water. Except for whole effluent toxicity (WET) testing, the parameters measured in the effluent are the same as those measured in the influent. The NPDES permit requires effluent monitoring and imposes permit limits to ensure the health of the receiving water.

Table H-4 lists the treatment plant monitoring program parameters, including sample type, sampling frequency and analytical procedures used.

H.2.b Combined Sewer Overflow Facilities Monitoring Program

The CSO Monitoring Program includes influent and effluent monitoring at the six CSO facilities, although only three of them are currently included in the MWRA NPDES permit. Influent and effluent samples are collected and tested for conventional parameters at all six CSO facilities. For the permitted facilities, in addition to conventional parameters, select priority pollutants are also analyzed in the effluent. Table H-5 lists the CSO monitoring program parameters, including sample type, sampling frequency and analytical procedures used.

H.2.c Sewer System Monitoring Program

The Sewer System Monitoring Program, which attempts to identify Sanitary Sewer Overflows (SSOs), involves conducting visual inspections of areas in the separate sewer system that have a history of discharging during or shortly after a heavy rainfall event. Because of the hydraulics of the South System, discharges occur in manholes or other low-lying areas, while discharges in the North System are the result of combined sewage overwhelming sewage system capacity.

H.3 Treatment of Results

It can be difficult to interpret laboratory results and to ensure that they are representative of the sample, especially when the results are at or below method detection levels. For the conventional parameters measured in these monitoring programs, calculating the average concentration of a particular parameter was straightforward: the arithmetic average was used. However, the concentrations of metals, pesticides and organics are very frequently below method detection levels, and data were manipulated. Appendix J gives a brief description of method detection limits and how measurements below detection limits are treated in this report.

Daily loadings were calculated using the formula:

Loadings (lbs/day) = Q*C*8.34

where Q= flow (mgd)

C = concentration (mg/L)

8.34 = unit conversion factor

Monthly average concentrations for priority pollutants (metals, cyanide, pesticides/PCBs and organic compounds) were calculated by adding the loadings of the pollutant during each sampling event for that month and then dividing it by the total flow during those sampling events.

Average annual concentrations were calculated using the same method, taking each individual sampling event into account in the calculation.

It should be kept in mind that with the large flows going through the Deer Island Treatment Plant, taking one small sample may not always be truly representative. It is also important to keep in mind that certain parameters (conventional) were analyzed daily while other parameters (priority pollutants) were analyzed only two or three times per month.

Table H-4
POTW Monitoring Program

Parameter	Sample Type[1]	Sampling Frequency		Analytical Method[2]
		Influent	Effluent	
Metals				
Antimony	Composite	8 x per month	8 x per month	204.2
Arsenic	Composite	8 x per month	8 x per month	206.2
Beryllium	Composite	8 x per month	8 x per month	200.7
Boron	Composite	8 x per month	8 x per month	200.7
Cadmium	Composite	8 x per month	8 x per month	213.1
Chromium	Composite	8 x per month	8 x per month	200.7
Lead	Composite	8 x per month	8 x per month	239.2
Mercury	Composite	8 x per month	8 x per month	245.1
Molybdenum	Composite	8 x per month	8 x per month	200.7
Nickel	Composite	8 x per month	8 x per month	200.7
Selenium	Composite	8 x per month	8 x per month	270.2
Silver	Composite	8 x per month	8 x per month	200.7
Thallium	Composite	8 x per month	8 x per month	279.2
Zinc	Composite	8 x per month	8 x per month	200.7
Cyanide	Grab	3 x per month	3 x per month	335.2
TPH	Grab	3 x per month	6-7 x per month	418.1
Pesticides/PCBs	Composite	3 x per month	3 x per month	608
Semi-volatiles	Composite	2 x per month	3 x per month	625
Volatiles	Grab	2 x per month	3 x per month	624
Whole Effluent Toxicity[3]	Composite		1 x per month	WET Test Protocols

[1] Influent and effluent composite samples are 24-hour time composite samples.

[2] EPA Methods.

[3] Effluent sample only.

Table H-4 [cont.]
POTW Monitoring Program

Parameter	Sample Type[1]	Sampling Frequency		Analytical Method[2]
		Influent	Effluent	
Conventional				
pH	Grab	1 x per day	1 x per day	150.1
Settleable Solids	Grab	1 x per day	1 x per day	160.5
Biochemical Oxygen Demand	Composite	1 x per day	1 x per day	405.1
Carbonaceous BOD	Composite	1 x per day	1 x per day	405.1
Chemical Oxygen Demand	Composite	1 x per day	1 x per day	410.1
Total Suspended Solids	Composite	1 x per day	1 x per day	160.2
Total Coliform	Grab		3 x per day	9222 D[3]
Fecal Coliform	Grab		3 x per day	9222 B[3]
Oil and Grease	Grab	1 x per week	1 x per week	413.1
Chlorides	Composite	1 x per day		4500 B[3]
Total Chlorine Residual	Grab		3 x per day	330.5
Nutrients[4]				
Total Kjeldahl Nitrogen	Composite	1 x per week	1 x per week	351.3
Ammonia	Composite	1 x per week	1 x per week	350.2
Nitrates	Composite	1 x per week	1 x per week	353.3
Nitrites	Composite	1 x per week	1 x per week	354.1
Orthophosphorus	Composite	1 x per week	1 x per week	365.2
Total Phosphorus	Composite	1 x per week	1 x per week	365.2

[1] Influent and effluent composite samples are 24-hour time composite samples.

[2] EPA Methods.

[3] Standard Methods.

[4] Sampling frequency is once a week at Deer Island.

Table H-5
CSO Monitoring Program

Parameter	Sample Type	Sampling Frequency	Analytical Method[1]
pH	Grab[2]	See Footnote 2	150.1
Biochemical Oxygen Demand	Grab[2]	See Footnote 2	405.1
Total Suspended Solids	Grab[2]	See Footnote 2	160.2
Settleable Solids	Grab[2]	See Footnote 2	160.5
Fecal Coliform	Grab[2]	See Footnote 2	9222 B[3]
Total Chlorine Residual	Grab[2]	See Footnote 2	330.5

[1] EPA Methods.
[2] Grab samples are collected once within the first 2 hours of each discharge from the CSO treatment facility and every eight hours thereafter.
[3] Standard Methods.

Appendix J

Instrument Detection Limits, Method Detection Limits, and Quantitation Limits: A Brief Description

An understanding of the detection limits of analysis is essential to reviewing the data from chemical analyses. There are three different types of detection limits that are most often encountered:

- **Instrument Detection Limits**
- **Method Detection Limits**
- **Quantitation Limits**, also known as **Reporting Limits.**

Instrument detection limits (IDL) reflect the capability of the instrument. This will be the lowest of the three detection limits. The IDL will not take into account the losses of the pollutant associated with the matrix (soil or wastewater) and extraction procedure. This discrepancy is known as matrix interference.

Method detection limits (MDL) are the smallest amount of a substance that can be detected above background noise using a particular method. The MDL is statistically determined by running a series of analyses using various low concentrations of a pollutant. Using a Student's “T” test, the smallest concentration that has a 99% probability of being detected above the background is designated the MDL for that pollutant. The EPA, using several private laboratories, has determined what the MDLs are for most priority pollutants using their approved methods. These are published in the 40 CFR and some are listed in Table K-1 of Appendix K of this report.

In general, if a plot is made of pollutant concentration versus instrument response, it will generate a linear relationship. As the pollutant concentration approaches zero, the linearity of the relationship is lost. At the point where the linearity is lost is the **Quantitation Limit (QL)** or sometimes the **Reporting Limit**. In other words, the smallest concentration where the linear relationship holds is

the smallest concentration that can be quantified. Generally, the QL is about five times the MDL. Quantitative limits are relevant to GC/MS analyses, that is, methods 608 (for pesticides), 624 (for volatile organics), and 625 (for semi-volatile organics). Specific limits are highly matrix-dependent.

The EPA has developed **Contract Required Quantitation Limits (CRQL)**, which serve as a guideline for selecting contract laboratories to perform analyses. Some CRQLs are listed in Table K-1 of this report.

In short, the IDL is the lowest concentration that a particular instrument can detect. The MDL is the lowest concentration that can be detected using a particular method. The QL is the smallest concentration that can be confidently considered to be accurate.

Reported concentrations that are between the MDL and the QL indicate that a pollutant is present, but at a concentration too low to be accurately quantified. For example, using EPA method 624, chloroform has an MDL of 1.6 μg/L and a QL of 10 μg/L. If the concentration from an analysis is reported as 5 μg/L then it can be inferred that although the actual chloroform concentration in the wastewater is uncertain, 5 μg/L is a best guess. The EPA requires that these intermediate values be flagged with a "J" on any reports submitted to them. Therefore, these are sometimes simply called "J-values."

For non-detects in analyses of metals, cyanide, petroleum hydrocarbons, etc., it is customary for "less than the MDL" to be listed as a result. For a non-detect in the 608, 624, and 625 analyses, "less than the QL" is typically listed.

Often it becomes necessary to estimate a concentration for below detection limit values, specifically when calculating the average yearly concentration of a pollutant. A well established method is to assume the actual concentration of a non-detected pollutant is simply one half of the MDL. While no scientific theory supports this assumption, it is more reasonable than assuming that the

concentration is zero, or the MDL itself. It is also accepted by the EPA and DEP as a standard practice that can be applied to any series of tests.

This technique is utilized in this report. For the organic compounds – methods 608, 624, and 625 – one tenth of the QL, or half the MDL, was assumed for all non-detects (i.e. values below QL). For all metals, cyanide, petroleum hydrocarbons, etc., half the MDL was assumed for all non-detects (i.e. values below MDL).

In Appendix K, Table K-1 is a list of the parameters regularly tested for in MWRA effluent. The required EPA method is referenced by its number and the recommended EPA detection limit is provided. The CRQL is also provided when applicable. These limits are compared to the detection levels normally attained by the contract laboratory analyzing MWRA effluent.

Appendix K

Priority Pollutants List and Other Parameters

Table K-1 List of Parameters Tested

Table K-2 EPA List of 126 Priority Pollutants

Table K-3 NPDES Permit Testing Requirements, 40 CFR 122, Appendix D, Tables I and II

Table K-1
List of Parameters Tested

(Influent and Effluent)*

	EPA Method Number	EPA MDL	CRQL	Contract Lab MDL	Contract Lab QL
METALS					
Antimony	204.2	3.0	NA	5.0	NA
Arsenic	206.2	1.0	NA	2.0	NA
Beryllium	200.7	0.3	NA	1.0	NA
Cadmium	213.2	0.1	NA	1.0	NA
Chromium	218.2	1.0	NA	5.0	NA
Copper	200.7	6.0	NA	4.0	NA
Lead	239.2	1.0	NA	1.5	NA
Mercury	245.1	0.2	NA	0.2	NA
Nickel	200.7	15.0	NA	12.0	NA
Selenium	270.2	2.0	NA	2.0	NA
Thallium	279.2	1.0	NA	2.0	NA
Zinc	200.7	2.0	NA	10.0	NA
Boron	200.7	5.0	NA	30.0	NA
Molybdenum	246.2	1.0	NA	8.0	NA
Silver	272.2	0.2	NA	3.0	NA
OTHER INORGANIC CHEMICALS **					
Cyanide	335.2	20.0	NA	10.0	NA
Hexavalent Chromium	307 B	10.0	NA	5.0	NA
Oil & Grease (mg/L)	413.1	5.0	NA	5.0	NA
Petroleum Hydrocarbons (mg/L)		1.0	NA	1.0	NA
Surfactants (mg/L)		25.0	NA	25.0	NA
PESTICIDES	608			NA	
alpha-BHC		0.003	0.05		0.05
beta-BHC		0.006	0.05		0.05
delta-BHC		0.009	0.05		0.05
gamma-BHC (Lindane)		0.004	0.05		0.05
Heptachlor		0.003	0.05		0.05
Aldrin		0.004	0.05		0.05
Heptachlor epoxide		0.083	0.05		0.05
Endosulfan I		0.014	0.05		0.05
Endrin aldehyde		0.023	0.10		0.10
Dieldrin		0.002	0.10		0.10
4,4'-DDE		0.004	0.10		0.10
Endrin		0.006	0.10		0.10
Endosulfan II		0.004	0.10		0.10
4,4'-DDD		0.011	0.10		0.10
Endosulfan sulfate		0.066	0.10		0.10
4,4'-DDT		0.012	0.10		0.10
Methoxychlor			0.50		0.50

Table K-1 [cont.]

(Influent and Effluent)*

	EPA Method Number	EPA MDL	CRQL	Contract Lab MDL	Contract Lab QL
Toxaphene		0.240	0.50		5.00
Chlordane		0.014	1.00		1.00
PCBs					
Aroclor-1016		ND	2.00		2.00
Aroclor-1221		ND	1.00		1.00
Aroclor-1232		ND	1.00		1.00
Aroclor-1242		0.065	1.00		1.00
Aroclor-1248		ND	1.00		1.00
Aroclor-1254		ND	1.00		1.00
Aroclor-1260		ND	0.05		0.20
VOLATILE ORGANICS	624				
Chloromethane		ND	10		10
Bromomethane		ND	10		10
Vinyl chloride		ND	10		10
Chloroethane		ND	10		10
Methylene chloride		2.8	10		10
Acetone			10		10
Carbon disulfide			10		10
1,1-dichloroethylene		2.8	10		10
1,1-dichloroethane		4.7	10		10
1,2-dichloroethylene		1.6	10		10
Chloroform		1.6	10		10
Methylethyl ketone (2-butanone)			10		10
1,2-dichloroethane		2.8	10		10
1,1,1-trichloroethane		3.8	10		10
Carbon tetrachloride		2.8	10		10
Vinyl acetate			10		10
Bromodichloromethane		2.2	10		10
1,2-dichloropropane		6.0			
Cis-1,3-dichloropropene		5.0	10		10
Trichloroethylene		1.9	10		10
Chlorodibromomethane		3.1	10		10
1,1,2-trichloroethane		5.0	10		10
Benzene		4.4	10		10
Trans-1,3-dichloropropene		ND	10		10
Bromoform		4.7	10		10
4-methyl-2-pentanone			10		10
2-hexanone			10		10
Tetrachloroethylene		4.1	10		10
1,1,2,2-tetrachloroethane		6.9	10		10
Toluene		6.0	10		10

Table K-1 [cont.]

(Influent and Effluent)*

	EPA Method Number	EPA MDL	CRQL	Contract Lab MDL	Contract Lab QL
Chlorobenzene		6.0	10		10
Ethylbenzene		7.2	10		10
Styrene			10		10
Xylene (Total)			10		10
2-chloroethylvinylether			10		10
Trichlorofluoromethane			10		10
Acrolein			10		10
Acrylonitrile			10		10
SEMI-VOLATILES	625				
Phenol		1.5	10		10
Bis (2-chloroethyl) ether		5.7	10		10
2-chlorophenol		3.3	10		10
m-dichlorobenzene		1.9	10		10
p-dichlorobenzene		1.9	10		10
o-dichlorobenzene		1.9	10		10
o-cresol			10		10
2,2'-oxybis (1-chloropropane)		5.7	10		10
p-cresol			10		10
N-nitroso-di-n-propylamine		ND	10		10
Hexachloroethane		1.6	10		10
Nitrobenzene		1.9	10		10
Isophrone		2.2	10		10
o-nitrophenol		3.6	10		10
2,4-dimethylphenol		2.7	10		10
Bis (2-chloroethoxy)methane		5.3	10		10
2,4-dichlorophenol		2.7	10		25
1,2,4-trichlorobenzene		1.9	10		10
Naphthalene		1.6	10		10
p-chloroaniline			10		10
Hexachlorobutadiene			10		10
p-chloro-m-cresol			10		10
2-methylnaphthalene			10		10
Hexachlorocyclopentadiene		ND	10		10
2,4,6-trichlorophenol		2.7	10		10
2,4,5-trichlorophenol			25		25
2-chloronaphthalene		1.9	10		10
o-nitroaniline			25		25
Dimethyl phthalate		1.6	10		10
Acenaphthylene		3.5	10		10
2,6-dinitrotoluene		1.9	10		10
m-nitroaniline			25		25

Table K-1 [cont.]

(Influent and Effluent)*

	EPA Method Number	EPA MDL	CRQL	Contract Lab MDL	Contract Lab QL
Acenaphthene		1.9	10		10
2,4-dinitrophenol		42.0	25		25
p-nitrophenol		3.6	25		25
Dibenzofuran			10		10
2,4-dinitrotoluene		5.7	10		10
Diethyl phthalate		1.9	10		10
4-chlorophenyl phenyl ether		4.2	10		10
Fluorene		1.9	10		10
p-nitroaniline			25		25
4,6-dinitro-o-cresol			10		10
N-nitrosodiphenylamine		1.9	10		10
4-bromophenyl phenyl ether		1.9	10		10
Hexachlorobenzene		1.9	10		10
Pentachlorophenol		3.6	25		10
Phenanthrene		5.4	10		10
Anthracene		1.9	10		10
Di-n-butyl phthalate		2.5	10		10
Fluoranthene		2.2	10		10
Pyrene		1.9	10		10
Butyl benzyl phthalate		2.5	10		10
3,3'-dichlorobenzidine		16.5	10		10
Benzo(a)anthracene		7.8	10		10
Chrysene		2.5	10		10
Bis (2-ethylhexyl) phthalate		2.5	10		10
Di-n-octyl phthalate		2.5	10		10
Benzo(b)fluoranthene		4.8	10		10
Benzo(k)fluoranthene		2.5	10		10
Benzo(a)pyrene		2.5	10		10
Indeno(1,2,3-cd)pyrene		3.7	10		10
Dibenzo(a,h)anthracene		2.5	10		10
Benzo(ghi)perylene		4.1	10		10
Benzoic acid			10		10
Benzyl alcohol		ND	10		10
Benzidene		44	10		10
1,2-diphenylhydrazine			10		10
N-nitrosodimethylamine		ND	10		10

* Pollutants analyzed in addition to influent and effluent analyses of conventional pollutants listed in Appendix A, Table A-1. All units expressed in mg/L unless otherwise noted.

** Units expressed in mg/L.

ND - Not determined by EPA

NA - Not applicable

Table K-2
EPA List of 126 Priority Pollutants

Chlorinated Benzenes
- Chlorobenzene
- 1,2-dichlorobenzene
- 1,3-dichlorobenzene
- 1,4-dichlorobenzene
- 1,2,4-trichlorobenzene
- Hexachlorobenzene

Chlorinated Ethanes
- Chloroethane
- 1,1-dichloroethane
- 1,2-dichloroethane
- 1,1,1-trichloroethane
- 1,1,2,2-tetrachloroethane
- Hexachloroethane

Chlorinated Phenols
- 2-chlorophenol
- 2,4-dichlorophenol
- 2,4,6-trichlorophenol
- Parametachlorocresol (4-chloro-3-methyl phenol)

Other Chlorinated Organics
- Chloroform (trichloromethane)
- Carbon tetrachloride (tetrachloromethane)
- Bis(2-chloroethoxy)methane
- Bis(2-chloroethyl)ether
- 2-chloroethyl vinyl ether (mixed)
- 2-chloronaphthalene
- 3,3'-dichlorobenzidine
- 1,1-dichlorethylene
- 1,2-trans-dichloroethylene
- 1,2-dichloropropane
- 1,2-dichloropropylene (1,3-dichloropropene)
- Tetrachloroethylene
- Trichloroethylene
- Vinyl chloride (chloroethylene)
- Hexachlorobutadiene
- Hexachlorocyclopentadiene
- 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD)

Haloethers
- 4-chlorophenyl phenyl ether
- 2-bromophenyl phenyl ether
- Bis(2-chloroisopropyl) ether

Halomethanes
- Methylene chloride (dichloromethane)
- Methyl chloride (chloromethane)
- Methyl bromide (bromomethane)
- Bromoform (tribromomethane)
- Dichlorobromomethane
- Chlorodibromomethane

Nitroamines
- N-nitrosodimethylamine
- N-nitrosodiphenylamine
- N-nitrosodi-n-propylamine

Phenols (other than chlorinated)
- 2-nitrophenol
- 4-nitrophenol
- 2,4-dinitrophenol
- 4,6-dinitro-o-cresol (4,6-dinitro-2-methylphenol)
- Pentachlorophenol
- Phenol
- 2,4-dimethylphenol

Phthalate Esters
- Bis(2-ethylhexyl)phthalate
- Butyl benzyl phthalate
- Di-n-butyl phthalate
- Di-n-octyl phthalate
- Diethyl phthalate
- Dimethyl phthalate

Polynuclear Aromatic Hydrocarbons (PAHs)

- Acenaphthene
- 1,2-benzanthracene (benzo(a)anthracene)
- Benzo(a)pyrene (3,4-benzo-pyrene)
- 3,4-benzofluoranthene (benzo(b)fluoranthene)
- 11,12-benzofluoranthene (benzo(k)fluoranthene)
- Chrysene
- Acenaphthylene
- Anthracene
- 1,12-benzoperylene (benzo(ghi)perylene)
- Fluorene
- Fluoranthene
- Phenanthrene
- 1,2,5,6-dibenzanthracene (dibenzo(a,h)anthracene)
- Indeno (1,2,3-cd) pyrene (2,3-o-phenylene pyrene)
- Pyrene

Pesticides and Metabolites

- Aldrin
- Dieldrin
- Chlordane (technical mixture and metabolites)
- Alpha-endosulfan
- Beta-endosulfan
- Endosulfan sulfate
- Endrin
- Endrin aldehyde
- Heptachlor
- Heptachlor epoxide (BHC-hexachlorocyclohexane)
- Alpha-BHC
- Beta-BHC
- Gamma-BHC (Lindane)
- Delta-BHC
- Toxaphene

DDT and Metabolites

- 4,4-DDT
- 4,4-DDE (p,p-DDX)
- 4,4-DDD (p,p-DDE)

Polychlorinated Biphenyls (PCBs)

- PCB-1242 (Aroclor 1242)
- PCB-1254 (Aroclor 1254)
- PCB-1221 (Aroclor 1221)
- PCB-1232 (Aroclor 1232)
- PCB-1248 (Aroclor 1248)
- PCB-1260 (Aroclor 1260)
- PCB-1016 (Aroclor 1016)

Other Organics

- Acrolein
- Acrylonitrile
- Benzene
- Benzidine
- 2,4-dinitrotolulene
- 2,6-dinitrotolulene
- Ethylbenzene
- Isophrone
- Naphthalene
- Nitrobenzene
- Tolulene

Inorganics

- Antimony
- Arsenic
- Asbestos
- Beryllium
- Cadmium
- Chromium (III)
- Chromium (VI)
- Copper
- Cyanide, total
- Lead
- Mercury
- Nickel
- Selenium
- Silver
- Thallium
- Zinc

Table K-3
NPDES Permit Application Testing Requirements, 40 CFR 122, Apppendix D, Tables II and III

Organic Toxic Pollutants

Volatiles

acrolein
acrylonitrile
benzene
bromoform
carbon tetrachloride
chlorobenzene
chlorodibromomethane
chloroethane
2-chloroethylvinyl ether
chloroform
dichlorobromomethane
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethylene
1,2-dichloropropane
1,3-dichloropropylene
ethyl benzene
methyl bromide
methyl chloride
methylene chloride
1,1,2,2-tetrachloroethane
tetrachloroethylene
toluene
1,2-trans-dichloroethylene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethylene
vinyl chloride

Acid Compounds

2-chlorophenol
2,4-dichlorophenol
2,4-dimethylphenol
4,6-dinitro-o-cresol (2-methyl-4,6-dinitrophenol)
2,4-dinitrophenol
2-nitrophenol
4-nitrophenol
p-chloro-m-cresol (4-chloro-m-cresol)
pentachlorophenol
phenol
2,4,6-trichlorophenol

Base/Neutral

acenaphthene
acenaphthylene
anthracene
benzidine
benzo(a)anthracene
benzo(a)pyrene
3,4-benzofluoranthracene
benzo(ghi)perylene
benzo(k)fluoranthene
bis(2-chloroethoxy)methane
bis(2-chloroethyl)ether
bis(2-ethylhexyl)phthalate
4-bromophenyl phenyl ether
butylbenzyl phthalate
2-chloronaphthalene
4-chlorophenyl phenyl ether
chrysene
dibenzo(a,h)anthracene
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
3-3'-dichlorobenzidine
diethyl phthalate
dimethyl phthalate
di-n-butyl phthalate
2,4-dinitrotoluene
2,6-dinitrotoluene
di-n-octyl phthalate
1,2-diphenylhydrazine
fluoranthene
fluorene
hexachlorobenzene
hexachlorobutadiene
hexachlorocyclopentadiene
hexachloroethane
indeno(1,2,3-cd)pyrene
isophorone
napthalene
nitrobenzene
N-nitrosodimethylamine
N-nitrosodi-n-propylamine
N-nitrosodiphenylamine
phenanthrene

pyrene
1,2,4-trichlorobenzene

Pesticides

aldrin
alpha-BHC
beta-BHC
gamma-BHC
delta-BHC
chlordane
4,4'-DDT
4,4'-DDE
4,4'-DDD
dieldrin
alpha-endosulfan
beta-endosulfan
endosulfan sulfate
endrin
endrin aldehyde
heptachlor
heptachlor epoxide
PCB-1242
PCB-1254
PCB-1221
PCB-1232
PCB-1248
PCB-1260
PCB-1016
toxaphene

Other Toxic Pollutants (Metals and Cyanide) and Total Phenols

antimony, total
arsenic, total
beryllium, total
cadmium, total
chromium, total
copper, total
lead, total
mercury, total
nickel, total
selenium, total
silver, total
thallium, total
zinc, total
cyanide, total
phenols, total