MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

OPERATIONAL MEMO GEN-8
REVISION 8

TO: Waste and Hazardous Materials Division Supervisors

FROM: George W. Bruchmann, Chief
Waste and Hazardous Materials Division

DATE: December 22, 2006

SUBJECT: Laboratory Detection Limits for Environmental Detection Monitoring Programs

The attached tables list chemical analytical methods and reporting limits (RLs) for water and soil. The RLs were developed by the Department of Environmental Quality (DEQ), Environmental Laboratory, for use in environmental contamination detection, compliance, and response activities. Note that these RLs are subject to change depending on changes in technology, methods, or U.S. Environmental Protection Agency requirements. To reflect these changes, the Waste and Hazardous Materials Division (WHMD) will update this Operational Memo as new RLs are issued, but no more than once a year. Facilities that are subject to DEQ detection limits should be advised of this policy and supplied with the most current version.

The attached RLs are to be used by WHMD staff for the development, evaluation, and implementation of any environmental detection monitoring programs (i.e., groundwater, surface water, soil, sediment, etc.) that are required pursuant to Part 31, Water Resources Protection (i.e., development of mixing zones); Part 111, Hazardous Waste Management; and Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), and the administrative rules promulgated thereto. The WHMD requires any laboratory utilized to analyze data for environmental detection monitoring programs to routinely achieve these RLs for the monitored parameters of concern (i.e., exceptions are discussed in the following material). Detection limits may be lower than those listed.

"Reporting limits" is a term used by the Environmental Laboratory. The RLs are not method detection limits (MDLs). The MDLs are the lowest concentration of an analyte that can be detected with 99 percent confidence that the analyte is actually present (i.e., based on a one-tailed Student's t distribution). The RLs are derived from MDLs. The RL is equal to, or greater than, the MDL. The RL reflects the Environmental Laboratory's ability to achieve this level of detection on actual environmental samples in most instances. For ease of reporting, some RLs are rounded up to achieve consistency within an analyte group. The RL list provides general detection limits that serve as performance standards for evaluating a laboratory's capabilities. The WHMD

requires the MDLs for detection monitoring programs to be equivalent to, or lower than, the RLs established by the Environmental Laboratory for the following reasons:

1. The WHMD considers the RLs established by the Environmental Laboratory to be a reasonable performance standard for laboratories that do testing for environmental detection monitoring programs.

2. Low detection limits are necessary to detect and react to a release to the environment at the earliest possible opportunity.

3. The Environmental Laboratory will be used to analyze samples that are collected by WHMD staff to evaluate the performance of environmental detection monitoring programs. Any resulting regulatory action would be based on the DEQ analytical data above the RLs.

The WHMD, in consultation with the Environmental Laboratory, may accept detection limits other than those published by the DEQ depending on site conditions and sample/laboratory limitations. Exceptions may be made for specific analytes for which there is matrix interference. Also, exceptions may be made for analytes that occur naturally in groundwater at high levels. For example, if the background concentration of chloride in groundwater is 100 parts per million (ppm), then it may not be necessary to require that the facility meet a 1 ppm detection limit.

A facility requesting an alternate detection level may be asked to provide documentation to the WHMD to support their request. The documentation should include, but not be limited to, method procedures, use of a field blank, all raw data, and quality assurance and quality control data (i.e., instrument calibration, precision and accuracy, surrogates, and internal standards). A written description of attempts to achieve the RL should be provided, along with observations and the rationale as to why the RL cannot be met.

Please note that some of the RLs listed on the attached tables are lower than the detection limits listed in the DEQ, Remediation and Redevelopment Division's (RRD) Operational Memorandum No. 2. The detection limits contained in that Operational Memorandum are an interpretation of Part 201, Environmental Remediation, of Act 451, and have been developed to ensure that a "cleanup" to risk-based levels of contamination has been achieved during remediation activities. As noted in the RRD's Operational Memorandum, some of the "remediation" detection limits are too high to be applicable to environmental detection monitoring programs.

Attachments

Table 1: ENVIRONMENTAL REPORTING LIMITS (RL) FOR DEQ-ESSD LABORATORY SECTION

VOLATILE ORGANICS	Water/TCLP/SPLP Reporting Limits (ug/L)	MeOH Sediment/Soil Reporting Limits (ug/Kg)	Oil Reporting Limits (mg/Kg)	Wastewater Reporting Limits (ug/L)	Water/Wastewater Containers & Hold Times	Sediment/Soil Containers & Hold Times	Oil Containers	TCLP/SPLP Containers & Hold Times
Method	8260	8260	8260	624.0				
1,1,1,2-Tetrachloroethane	1.0	50	1.0	1.0	3 - 40mL glass vial	40mL tared glass	5mL of sample	2 - 25g Encores
1,1,1-Trichloroethane	1.0	50	1.0	1.0	w/Teflon Septum	vial	in glass	48hours refrigerat
1,1,2,2-Tetrachloroethane	1.0	50	1.0	1.0	HCL pH<2	10grams sample	"	then up to 12 day
1,1,2-Trichloroethane	1.0	50	1.0	1.0	14 days HT	in 10mL MeOH	"	frozen HT
1,1-Dichloroethane	1.0	50	1.0	1.0	"	w/teflon septum	"	"
1,1-Dichloroethylene	1.0	50	1.0	1.0	"	14 days HT	"	"
1,2,3-Trichlorobenzene	5.0	250	5.0	5.0	"	"	"	"
1,2,3-Trichloropropane	1.0	50	1.0	1.0	"	"	"	"
1,2,3-Trimethylbenzene	1.0	50	1.0	NA	"	"	"	"
1,2,4-Trichlorobenzene	5.0	250	5.0	5.0	"	"	"	"
1,2,4-Trimethylbenzene	1.0	50	1.0	1.0	"	"	"	"
1,2-Dibromo-3-chloropropane	5.0*	250*	5.0	5.0	"	"	"	"
1,2-Dibromoethane (EDB)	1.0*	50(20)	1.0	1.0	"	"	"	"
1,2-Dichlorobenzene	1.0	50	1.0	1.0	"	"	"	"
1,2-Dichloroethane	1.0	50	1.0	1.0	"	"	"	"
1,2-Dichloroethylene (cis)	1.0	50	1.0	1.0	"	"	"	"
1,2-Dichloroethylene (trans)	1.0	50	1.0	1.0	"	"	"	"
1,2-Dichloropropane	1.0	50	1.0	1.0	"	"	"	"
1,3,5-Trimethylbenzene(Mesitylen	1.0	50	1.0	1.0	"	"	"	"
1,3-Dichlorobenzene	1.0	50	1.0	1.0	"	"	"	"
1,3-Dichloropropene (cis)	1.0	50	1.0	1.0	"	"	"	"
1,3-Dichloropropene (trans)	1.0	50	1.0	1.0	"	"	"	"
1,4-Dichloro-2-butene(trans)	5.0(1.0)	250(50)	5.0	5.0	"	"	"	"
1,4-Dichlorobenzene	1.0	50	1.0	1.0	"	"	"	"
2-Butanone (MEK)	5.0	250	5.0	5.0	"	"	"	"
2-Hexanone	5.0	250	5.0	5.0	"	"	"	"
2-Methylnaphthalene	5.0	250	5.0	5.0	"	"	"	"
Acetone (2-Propanone)	20	1,000	20	20	"	"	"	"
4-Methyl-2-Pentanone (MIBK)	5.0	250	5.0	5.0	"	"	"	"
Acrylonitrile	5.0(2.0)	250(100)	5.0	5.0	"	"	"	"
Benzene	1.0	50	1.0	1.0	"	"	"	"
Bromobenzene	1.0	50	1.0	1.0	"	"	"	"
Bromochloromethane	1.0	50	1.0	1.0	"	"	"	"
Bromodichloromethane	1.0	50	1.0	1.0	"	"	"	"
Bromoform	1.0	50	1.0	1.0	"	"	"	"
Bromomethane	5.0	200	5.0	5.0	"	"	"	"
Carbon disulfide	1.0	50	1.0	1.0	"	"	"	"
Carbon tetrachloride	1.0	50	1.0	1.0	"	"	"	"
Chlorobenzene	1.0	50	1.0	1.0	"	"	"	"
Chloroethane	5.0	250	5.0	5.0	"	"	"	"
Chloroform	1.0	50	1.0	1.0	"	"	"	"
Chloromethane	5.0	250	5.0	5.0	"	"	"	"
Cyclohexane	5.0	250	5.0	NA	"	"	"	"
Dibromochloromethane	1.0	50	1.0	1.0	"	"	"	"
Dibromomethane	1.0	50	1.0	1.0	"	"	"	"
Dichlorodifluoromethane	5.0	250	5.0	5.0	"	"	"	"
Diethyl ether	5.0	200	5.0	5.0	"	"	"	"
Diisopropyl Ether	5.0	250	5.0	NA	"	"	"	"
Ethylbenzene	1.0	50	1.0	1.0	"	"	"	"
Ethyltertiarybutylether	5.0	250	5.0	NA	"	"	"	"
Hexachloroethane	5.0	250	5.0	5.0	"	"	"	"
Isopropylbenzene	1.0	50	1.0	1.0	"	"	"	"
m&p-Xylene	2.0	100	2.0	2.0	"	"	"	"
Methyl Iodide (Iodomethane)	1.0	50	1.0	1.0	"	"	"	"
Methyl Tertiary Butyl Ether (MTBE	1.0	50	1.0	1.0	"	"	"	"
Methylene chloride	5.0	100	5.0	5.0	"	"	"	"
Naphthalene	5.0	250	5.0	5.0	"	"	"	"
n-Butylbenzene	1.0	50	1.0	1.0	"	"	"	"
n-Propylbenzene	1.0	50	1.0	1.0	"	"	"	"
o-Xylene	1.0	50	1.0	1.0	"	"	"	"
p-Isopropyl Toluene (p-Cymene)	1.0	50	1.0	1.0	"	"	"	"
sec-Butylbenzene	1.0	50	1.0	1.0	"	"	"	"
Styrene	1.0	50	1.0	1.0	"	"	"	"
tertiaryAmylmethylether	5.0	250	5.0	NA	"	"	"	"
Tertiary Butyl Alcohol	50	2,500	50	NA	"	"	"	"
tertiary Butylbenzene	1.0	50	1.0	1.0	"	"	"	"
Tetrachloroethylene	1.0	50	1.0	1.0	"	"	"	"
Tetrahydrofuran	5.0	250	5.0	5.0	"	"	"	"
Toluene	1.0	50	1.0	1.0	"	"	"	"
Trichloroethylene	1.0	50	1.0	1.0	"	"	"	"
Trichlorofluoromethane	1.0	50	1.0	1.0	"	"	"	"
Vinyl chloride	1.0	50(40)	1.0	1.0	"	"	"	"

Note: Results in ( ) are lower than the RL and will be reported with a "Z" and/or "T" qualifier code.
*If results are required below the limit listed, see page 4, OPMemo 2 special request

Revision:10/2006

Table 1: ENVIRONMENTAL REPORTING LIMITS (RL) FOR DEQ-ESSD LABORATORY SECTION

BTEX/MTBE/TMB VOLATILES	Water Reporting Limits (ug/L)	MeOH Sediment/Soil Reporting Limits (ug/Kg)	Oil Reporting Limits (mg/Kg)	Water Containers & Hold Times	Sediment/Soil Containers & Hold Times	Oil Containers
Method	8260	8260	8260			
Benzene	1.0	50	1.0	3 - 40mL glass vial	40mL tared glass	5mL of sampl
Toluene	1.0	50	1.0	w/Teflon Septum	vial	in glass
Ethylbenzene	1.0	50	1.0	HCL pH<2	10grams sample	"
m & p-Xylene	2.0	100	2.0	14 days HT	in 10mL MeOH	"
0 -Xylene	1.0	50	1.0	"	w/teflon seal	"
Methyl Tertiary Butyl Ether	1.0	50	1.0	"	14 days HT	"
1,2,3-Trimethylbenzene	1.0	50	1.0	"	"	"
1,2,4-Trimethylbenzene	1.0	50	1.0	"	"	"
1,3,5-Trimethylbenzene(Mesitylene)	1.0	50	1.0	"	"	"

Pesticides & Chlorinated Hydrocarbons	Water/TCLP/SPLP Reporting Limits (ug/L)	Sediment/Soil Reporting Limits (ug/Kg)	Oil Reporting Limits (mg/Kg)	Water Containers & Hold Times	Sediment/Soil/TCLP/SPLP Containers & Hold Times	Oil Containers
Method	8081/8121	8081/8121	8081/8121			
Aldrin	0.01	20	0.2	2 - 1000mL glass	1 - 8 ounce glass	10mL in glass
a-BHC	0.02	10	0.2	amber bottles	14 days HT	"
b-BHC	0.02	20	0.2	7 days HT	"	"
d-BHC	0.02	20	0.2	"	"	"
g-BHC (lindane)	0.02	20	0.2	"	"	"
BP-6 (PBB)	0.01	50	0.7	"	"	"
a-Chlordane	0.02	30	0.2	"	"	"
g-Chlordane	0.02	30	0.2	"	"	"
4,4'-DDD	0.02	20	0.2	"	"	"
4,4'-DDE	0.02	20	0.2	"	"	"
4,4'-DDT	0.02	20	0.2	"	"	"
Dieldrin	0.02	20	0.2	"	"	"
Endosulfan I	0.02	20	0.2	"	"	"
Endosulfan II	0.03	20	0.4	"	"	"
Endosulfan Sulfate	0.05	20	0.4	"	"	"
Endrin	0.02	20	0.2	"	"	"
Endrin Aldehyde	0.02	20	0.4	"	"	"
Endrin Ketone	0.02	20	0.4	"	"	"
Heptachlor	0.01	20	0.4	"	"	"
Heptachlor epoxide	0.01	20	0.4	"	"	"
Hexabromobenzene	0.02	100	0.2	"	"	"
Hexachlorobenzene	0.05	50	NA	To be added later this year		
Hexachlorobutadiene	0.05	50	NA	To be added later this year		
Hexachlorocyclopentadiene	0.05	50	NA	To be added later this year		
Methoxychlor	0.05	50	0.4	"	"	"
Mirex	0.02	50	0.2	"	"	"
Pentachlorobenzene	0.05	50	NA	To be added later this year		
Pentachloronitrobenzene	0.05	50	NA	To be added later this year		
1,2,3,4-Tetrachlorobenzene	0.05	50	NA	To be added later this year		
1,2,4,5-Tetrachlorobenzene	0.05	50	NA	To be added later this year		
Toxaphene	0.1	170	10	"	"	"

CHLORINATED VOLATILE ORGANICS	Water Reporting Limits (ug/L)	MeOH Sediment/Soil Reporting Limits (ug/Kg)	Water Containers & Hold Times	Sediment/Soil Containers & Hold Times
Method	8260	8260		
1,1,1,2-Tetrachloroethane	1.0	50	3 - 40mL glass vial	40mL tared glass
1,1,1-Trichloroethane	1.0	50	w/Teflon Septum	vial
1,1,2,2-Tetrachloroethane	1.0	50	HCL pH<2	10grams sample
1,1,2-Trichloroethane	1.0	50	14 days HT	in 10mL MeOH
1,1-Dichloroethane	1.0	50	"	w/teflon septum
1,1-Dichloroethylene	1.0	50	"	14 days HT
1,2-Dichloroethane	1.0	50	"	"
1,2-Dichloroethylene (cis)	1.0	50	"	"
1,2-Dichloroethylene (trans)	1.0	50	"	"
Chloroethane	5.0	250	"	"
Tetrachloroethylene	1.0	50	"	"
Trichloroethylene	1.0	50	"	"
Vinyl chloride	1.0	50(40)	"	"

Table 1: ENVIRONMENTAL REPORTING LIMITS (RL) FOR DEQ-ESSD LABORATORY SECTION

NPDES Scan 3 (Pesticides, Chlorinated Hydrocarbons, & PCBs) Method	Wastewater Reporting Limits (ug/L) 608/612	Wastewater Containers & Hold Times
Aldrin	0.01	2 - 1000mL glass
a-BHC	0.01	amber bottles
b-BHC	0.01	7 days HT
d-BHC	0.01	"
g-BHC (lindane)	0.01	"
BP-6 (PBB)	0.05	"
a-Chlordane	0.01	"
g-Chlordane	0.01	"
4,4'-DDD	0.05	"
4,4'-DDE	0.01	"
4,4'-DDT	0.01	"
Dieldrin	0.01	"
Endosulfan I	0.01	"
Endrin	0.01	"
Heptachlor	0.01	"
Heptachlor epoxide	0.01	"
Hexabromobenzene	0.01	"
Hexachlorobenzene	0.01	"
Hexachlorobutadiene	0.01	"
Hexachlorocyclopentadiene	0.01	"
Methoxychlor	0.05	"
Mirex	0.01	"
PCB 1016	0.1	"
PCB 1221	0.1	"
PCB 1232	0.1	"
PCB 1242	0.1	"
PCB 1248	0.1	"
PCB 1254	0.1	"
PCB 1260	0.1	"
PCB 1262	0.1	"
PCB 1268	0.1	"
Pentachlorobenzene	0.01	"
Pentachloronitrobenzene	0.01	"
Toxaphene	0.1	"
1,2,3,4-Tetrachlorobenzene	0.01	"
1,2,4,5-Tetrachlorobenzene	0.01	"

This scan is available for NPDES samples only.

PCBs Method	Water/Wastewater Reporting Limits (ug/L) 8082/608	Water/Wastewater Containers & Hold Times	Sediment/Soil Containers & Hold Times	Oil Containers
PCB-1016	0.1	2 - 1000mL glass	1 - 8 ounce glass	10mL in glass
PCB-1221	0.1	amber bottles	14 days HT	"
PCB-1232	0.1	7 days HT	"	"
PCB-1242	0.1	"	"	"
PCB-1248	0.1	"	"	"
PCB-1254	0.1	"	"	"
PCB-1260	0.1	"	"	"
PCB-1262	0.1	"	"	"
PCB-1268	0.1	"	"	"

Table 1: ENVIRONMENTAL REPORTING LIMITS (RL) FOR DEQ-ESSD LABORATORY SECTION

Polynuclear Aromatic Hydrocarbons (PNA or PAH)	Water Reporting Limits (ug/L)	Sediment/Soil Reporting Limits (ug/Kg)	Oil Reporting Limits (mg/Kg)	Water Containers & Hold Times	Sediment/Soil Containers & Hold Times	Oil Containers
Method	8270	8270	8270			
Acenaphthene	1.0	100	100	2 - 1000mL glass	1 - 8 ounce glass	10mL in glass
Acenaphthylene	1.0	100	100	amber bottles	14 days HT	"
Anthracene	1.0	100	100	7 days HT	"	"
Benz(a)anthracene	1.0	100	100	"	"	"
Benzo(b)fluoranthene	1.0	200	200	"	"	"
Benzo(k)fluoranthene	1.0	200	200	"	"	"
Benzo(a)pyrene	1.0	200	200	"	"	"
Benzo(g,h,i)perylene	1.0	200	200	"	"	"
Chrysene	1.0	100	100	"	"	"
Dibenz(a,h)anthracene	2.0	200	200	"	"	"
Fluoranthene	1.0	100	100	"	"	"
Fluorene	1.0	100	100	"	"	"
Indeno(1,2,3-cd)pyrene	2.0	200	200	"	"	"
2-Methylnaphthalene	5.0	250	500	"	"	"
Naphthalene	1.0	100	100	"	"	"
Phenanthrene	1.0	100	100	"	"	"
Pyrene	1.0	100	100	"	"	"

PHENOLS (ACIDS)	Water Reporting Limits (ug/L)	Water Containers & Hold Times
Method	8270	8270
2-Chlorophenol	10	2 - 1000mL glass
4-Chloro-3-methylphenol	5.0	amber bottles
3/4-Methylphenol (m/p-cresol)	20	7 days HT
2-Methylphenol (o-cresol)	10	"
2,4-Dichlorophenol	10	"
2,4-Dimethylphenol	5.0	"
2,4-Dinitrophenol	25	"
2-Methyl-4,6-dinitrophenol	20	"
2-Nitrophenol	5.0	"
4-Nitrophenol	25	"
Pentachlorophenol	20*	"
Phenol	5.0	"
2,4,5-Trichlorophenol	5.0	"
2,4,6-Trichlorophenol	4.0	"

*If results are required below the limit listed, see below, OPMemo 2 special request.

OPMemo 2 Special Request	Water Reporting Limits (ug/L)	Sediment/Soil Reporting Limits (ug/Kg)	Water Containers* & Hold Times	Sediment/Soil Containers** & Hold Times	
Method 8011 Modified	8011Modified	8011Modified			
1,2-Dibromo-3-chloropropane (DBCP)	0.2	10	2 - 40mL glass vial	40mL tared glass	
1,2-Dibromoethane (EDB)	0.05	20	w/Teflon Septum	vial	Analysis
Hexachlorobenzene (HCB)	0.2	20	HCL pH<2	10grams sample	not yet available
Hexachlorobutadiene (HCBD)	0.05	50	14 days HT	in 10mL MeOH	
Hexachlorocyclopentadiene (HCCP)	5.0	50	"	w/Teflon Septum	
Pentachlorophenol (PCP)	1.0	20	"	14 days HT	

*This is in addition to vials submitted for volatile analysis.
**The sample provided for volatile analysis may be used.

Table 1: ENVIRONMENTAL REPORTING LIMITS (RL) FOR DEQ-ESSD LABORATORY SECTION

Semivolatile Organics Base/Neutral	Water Reporting Limits (ug/L)	Sediment/Soil Reporting Limits (ug/Kg)	Oil Reporting Limits (mg/Kg)	Water Containers & Hold Times	Sediment/Soil Containers & Hold Times	Oil Containers
Method	8270	8270	8270			
1,2,4-Trichlorobenzene	2.0	200	200	2 - 1000mL glass	1 - 8 ounce glass	10mL in glass
2,4-Dinitrotoluene	5.0	250	500	amber bottles	14 days HT	"
2,6-Dinitrotoluene	5.0	250	500	7 days HT	"	"
2-Chloronaphthalene	2.0	200	200	"	"	"
2-Methylnaphthalene	5.0	250	500	"	"	"
2-Nitroaniline	20	500	2000	"	"	"
3-Nitroaniline	20	500	2000	"	"	"
4-Bromophenyl phenylether	2.0	200	200	"	"	"
4-Chlorophenyl phenylether	1.0	100	100	"	"	"
4-Nitroaniline	20	500	2000	"	"	"
Acenaphthene	1.0	100	100	"	"	"
Acenaphthylene	1.0	100	100	"	"	"
Aniline	4.0	NA	NA	"	"	"
Anthracene	1.0	100	100	"	"	"
Azobenzene	2.0	200	200	"	"	"
Benz(a)anthracene	1.0	100	100	"	"	"
Benzo(a)pyrene	1.0	200	200	"	"	"
Benzo(b)fluoranthene	1.0	200	200	"	"	"
Benzo(g,h,i)perylene	1.0	200	200	"	"	"
Benzo(k)fluoranthene	1.0	200	200	"	"	"
Benzyl Alcohol	50	2,500	NA	"	"	"
Bis(2-chloroethoxy)methane	2.0	200	200	"	"	"
Bis(2-chloroethyl)ether	1.0	100	100	"	"	"
Bis(2-chloroisopropyl)ether	1.0	100	100	"	"	"
Bis(2-ethylhexyl)phthalate	5.0	250	500	"	"	"
Butyl benzyl phthalate	5.0	250	500	"	"	"
Carbazole	5.0	250	1000	"	"	"
Chrysene	1.0	100	100	"	"	"
Dibenz(a,h)anthracene	2.0	200	200	"	"	"
Dibenzofuran	4.0	250	500	"	"	"
Diethyl phthalate	5.0	250	500	"	"	"
Dimethyl phthalate	5.0	250	500	"	"	"
Di-n-butyl phthalate	5.0	250	500	"	"	"
Di-n-octyl phthalate	5.0	250	500	"	"	"
Fluoranthene	1.0	100	100	"	"	"
Fluorene	1.0	100	100	"	"	"
Hexachlorobenzene	1.0*	200	200	"	"	"
Hexachlorobutadiene	1.0*	100(50)	200	"	"	"
Hexachlorocyclopentadiene	10(5)	1000(330)	1000	"	"	"
Hexachloroethane	1.0	100	100	"	"	"
Indeno(1,2,3-cd)pyrene	2.0	200	200	"	"	"
Isophorone	1.0	100	100	"	"	"
Naphthalene	1.0	100	100	"	"	"
Nitrobenzene	2.0	200	200	"	"	"
N-Nitrosodimethylamine	5.0	250	500	"	"	"
N-Nitrosodi-n-propylamine	2.0	200	200	"	"	"
N-Nitrosodiphenylamine	2.0	200	200	"	"	"
Phenanthrene	1.0	100	100	"	"	"
Pyrene	1.0	100	100	"	"	"
Pyridene	20	NA	NA	"	"	"

Note: Results in ( ) are lower than the RL and will be reported with a "Z" and/or "T" qualifier code.

*If results are required below the limit listed, see page 4, OPMemo 2 special request.

Table 1: ENVIRONMENTAL REPORTING LIMITS (RL) FOR DEQ-ESSD LABORATORY SECTION

Semivolatile Organics Base/Neutral/Acids	Water/TCLP/SPLP Reporting Limits (ug/L)	Sediment/Soil Reporting Limits (ug/Kg)	Oil Reporting Limits (mg/Kg)	Wastewater Reporting Limits (ug/L)	Water/Wastewater Containers & Hold Times	Sediment/Soil/TCLP/SPLP Containers & Hold Times	Oil Containers
Method	8270	8270	8270	625			
1,2,4-Trichlorobenzene	2.0	200	200	2.0	2 - 1000mL glass	1 - 8 ounce glass	10mL in glass
2,4,5-Trichlorophenol	5.0	330	1000	10	amber bottles	14 days HT	"
2,4,6-Trichlorophenol	4.0	330	1000	10	7 days HT	"	"
2,4-Dichlorophenol	10	330	1000	10	"	"	"
2,4-Dimethylphenol	5.0	330	1000	10	"	"	"
2,4-Dinitrophenol	25	1700(830)	5000	50	"	"	"
2,4-Dinitrotoluene	5.0	250	500	5.0	"	"	"
2,6-Dinitrotoluene	5.0	250	500	5.0	"	"	"
2-Chloronaphthalene	2.0	200	200	2.0	"	"	"
2-Chlorophenol	10	330	1000	10	"	"	"
2-Methyl-4,6-dinitrophenol	20	1700(830)	5000	50	"	"	"
2-Methylnaphthalene	5.0	250	500	5.0	"	"	"
2-Methylphenol	10	330	1000	10	"	"	"
2-Nitroaniline	20	500	2000	20	"	"	"
2-Nitrophenol	5.0	330	1000	10	"	"	"
3/4-Methylphenol	20	660	2000	20	"	"	"
3-Nitroaniline	20	500	2000	20	"	"	"
4-Bromophenyl phenylether	2.0	200	200	2.0	"	"	"
4-Chloro-3-methylphenol	5.0	200	1000	10	"	"	"
4-Chlorophenyl phenylether	1.0	100	100	1.0	"	"	"
4-Nitroaniline	20	500	2000	20	"	"	"
4-Nitrophenol	25	1700(830)	5000	50	"	"	"
Acenaphthene	1.0	100	100	1.0	"	"	"
Acenaphthylene	1.0	100	100	1.0	"	"	"
Aniline	4.0	NA	NA	NA	"	"	"
Anthracene	1.0	100	100	1.0	"	"	"
Azobenzene	2.0	200	200	2.0	"	"	"
Benz(a)anthracene	1.0	100	100	1.0	"	"	"
Benzo(a)pyrene	1.0	200	200	2.0	"	"	"
Benzo(b)fluoranthene	1.0	200	200	2.0	"	"	"
Benzo(g,h,i)perylene	1.0	200	200	2.0	"	"	"
Benzo(k)fluoranthene	1.0	200	200	2.0	"	"	"
Benzyl Alcohol	50	2,500	NA	NA	"	"	"
Bis(2-chloroethoxy)methane	2.0	200	200	2.0	"	"	"
Bis(2-chloroethyl)ether	1.0	100	100	1.0	"	"	"
Bis(2-chloroisopropyl)ether	1.0	100	100	1.0	"	"	"
Bis(2-ethylhexyl)phthalate	5.0	250	500	5.0	"	"	"
Butyl benzyl phthalate	5.0	250	500	5.0	"	"	"
Carbazole	5.0	250	1000	10	"	"	"
Chrysene	1.0	100	100	1.0	"	"	"
Dibenz(a,h)anthracene	2.0	200	200	2.0	"	"	"
Dibenzofuran	4.0	250	500	5.0	"	"	"
Diethyl phthalate	5.0	250	500	5.0	"	"	"
Dimethyl phthalate	5.0	250	500	5.0	"	"	"
Di-n-butyl phthalate	5.0	250	500	5.0	"	"	"
Di-n-octyl phthalate	5.0	250	500	5.0	"	"	"
Fluoranthene	1.0	100	100	1.0	"	"	"
Fluorene	1.0	100	100	1.0	"	"	"
Hexachlorobenzene	1.0*	200	200	2.0	"	"	"
Hexachlorobutadiene	1.0*	100(50)	200	2.0	"	"	"
Hexachlorocyclopentadiene	10(5)	1000(330)	1000	10	"	"	"
Hexachloroethane	1.0	100	100	1.0	"	"	"
Indeno(1,2,3-cd)pyrene	2.0	200	200	2.0	"	"	"
Isophorone	1.0	100	100	1.0	"	"	"
Naphthalene	1.0	100	100	1.0	"	"	"
Nitrobenzene	2.0	200	200	2.0	"	"	"
N-Nitrosodimethylamine	5.0	250	500	5.0	"	"	"
N-Nitrosodi-n-propylamine	2.0	200	200	2.0	"	"	"
N-Nitrosodiphenylamine	2.0	200	200	2.0	"	"	"
Pentachlorophenol	20*	1700(800)*	5000	50	"	"	"
Phenanthrene	1.0	100	100	1.0	"	"	"
Phenol	5.0	330	1000	10	"	"	"
Pyrene	1.0	100	100	1.0	"	"	"
Pyridene	20	NA	NA	NA	"	"	"

Note: Results in ( ) are lower than the RL and will be reported with a "Z" and/or "T" qualifier code.

*If results are required below the limit listed, see page 4, OPMemo 2 special request.

Table 1: ENVIRONMENTAL REPORTING LIMITS (RL) FOR MDEQ LABORATORY

Metals	Water Reporting Limits (ug/L)	Sediment/Soil Reporting Limits (ug/Kg)	[1]Analytical Method Reference EPA / SW-846	MDEQ Technique	Water Containers & Hold Times	Sediment Containers & Hold Times
Aluminum		5,000	200.7/6010B	ICP	500 mL plastic - 6 mo. HT	250 mL glass jar - 6 month HT
Aluminum	50	5,000	200.8/6020	ICP-MS	"	"
Antimony	1	300	200.8/6020	ICP-MS	"	"
Arsenic	1	500	200.8/6020	ICP-MS	"	"
Barium		1,000	200.7/6010B	ICP	"	"
Barium	5	1,000	200.8/6020	ICP-MS	"	"
Beryllium		200	200.7/6010B	ICP	"	"
Beryllium	1	200	200.8/6020	ICP-MS	"	"
Boron	20	NA	200.7/6010B	ICP	"	"
Cadmium		2,000	200.7/6010B	ICP	"	"
Cadmium	0.2	2,000	200.8/6020	ICP-MS	"	"
Calcium	1,000	50,000	215.1/7140	FAAS	"	"
Chromium		2,000	200.7/6010B	ICP	"	"
Chromium	1	2,000	200.8/6020	ICP-MS	"	"
Chromium VI	5		7196A	DPC	500 mL plastic - 24 hours HT	NA
Cobalt		2,000	200.7/6010B	ICP	500 mL plastic - 6 mo. HT	250 mL glass jar - 6 month HT
Cobalt	15	2,000	200.8/6020	ICP-MS	"	"
Copper		1,000	200.7/6010B	ICP	"	"
Copper	1	1,000	200.8/6020	ICP-MS	"	"
Iron	20	5,000	200.7/6010B	ICP	"	"
Lead		5,000	200.7/6010B	ICP	"	"
Lead	1	5,000	200.8/6020	ICP-MS	"	"
Lithium	10	2,000	200.7/6010B	ICP	"	"
Magnesium	1,000	50,000	242.1/7450	FAAS	"	"
Manganese		1,000	200.7/6010B	ICP	"	"
Manganese	5	1,000	200.8/6020	ICP-MS	"	"
Mercury	0.2	50	245.1/7470A,7471A	Cold Vapor	500 mL plastic - 28 days HT	250 mL glass jar - 28 days HT
Mercury (LL)	.0005		245.7/1631	CVAFS	FP bottles - 28 days HT	NA
Molybdenum		5,000	200.7/6010B	ICP	500 mL plastic - 6 mo. HT	250 mL glass jar - 6 month HT
Molybdenum	25	5,000	200.8/6020	ICP-MS	"	"
Nickel		5,000	200.7/6010B	ICP	"	"
Nickel	2	5,000	200.8/6020	ICP-MS	"	"
Potasium	100	5,000	258.1/7610	FAAS	"	"
Selenium	1	200	200.8/6020	ICP-MS	"	"
Silver	0.2	100	200.8/6020	ICP-MS	"	"
Sodium	1,000	50,000	273.1/7770	FAAS	"	"
Strontium		1,000	200.7/6010B	ICP	"	"
Strontium	5	1,000	200.8/6020	ICP-MS	"	"
Thallium	2	500	200.8/6020	ICP-MS	"	"
Titanium		1,000	200.7/6010B	ICP	"	"
Titanium	10	1,000	200.8/6020	ICP-MS	"	"
Vanadium		1,000	200.7/6010B	ICP	"	"
Vanadium	2	1,000	200.8/6020	ICP-MS	"	"
Zinc		5,000	200.7/6010B	ICP	"	"
Zinc	10	5,000	200.8/6020	ICP-MS	"	"

[1]EPA Methods for Chemical Analysis of Water and Wastes / SW-846 EPA Test Methods for Evaluating Solid Waste

GFAA = Graphite Furnace Atomic Absorption Spectroscopy

FAAS = Flame Atomic Absorption Spectroscopy

ICP = Argon Plasma Emission Spectroscopy

DPC = Diphenylcarbazide

ICP-MS = Inductively Coupled Plasma - Mass Spectrometry

CVAFS = Cold Vapor Atomic Fluorescence Spectrometry

FP = Fluoropolymer Bottles

Revision: 10/2006

Table 1: ENVIRONMENTAL REPORTING LIMITS (RL) FOR MDEQ LABORATORY

Non-Metals	Water Reporting Limits (ug/L)	Sediment/Soil Reporting Limits (mg/Kg)	[1] Analytical Method Reference EPA / SW-846	MDEQ Technique	Sampling Containers Waters/Sediment-Soil	Hold Times Water
Absorbance	.007~	NA	[2]204B	Spectrophotmetric	250 mL plastic	48 hours
Alkalinity	20,000	NA	310.2	Auto Colorimetric Methyl Orange	500 mL plastic	14 days
Alkalinity, Bicarbonate	10,000	NA	[2]2320B	Manual Titration	"	"
Alkalinity, Carbonate	10,000	NA	[2]2320B	Manual Titration	"	"
Ammonia	10	NA	350.1	Auto Colorimetric Phenolate	"	28 days
Available Cyanide	2	0.1	OI-1677	Amperometric	50 mL plastic tube/	14 days
BOD-Carb.	2000	NA	405.1	5 Day-DO Probe	500 mL plastic	48 hours
BOD-Total	2000	NA	405.1	5 Day-DO Probe	"	"
Chloride	1000	NA	325.2	Auto Colorimetric Ferricyanide	"	28 days
Chlorophyll	1.0	NA	[2]10200H	Fluorometric	250 mL plastic	48 hours
COD	5000	100	410.4	Colorimetric	500 mL plastic	28 days
Conductivity	1.0*	NA	120.1	Conductivity Cell	"	"
Cyanide	5	0.1	335.2/9010	Man. Dist., Colorimetric PBA	"	14 days
Dissolved Oxygen	100	NA	360.2	Manual Titration	250 mL glass	8 hours
Flash Point	>15°C	Yes/No	1010/1030	Closed Cup/Ingnitability of Solid	500 mL plastic	28 days
Hardness (Ca2CO3)	5000	NA	130.2	Calculated (Calcium & Magnesium)	500 mL plastic	6 months
Nitrate + Nitrite	10	NA	353.2	Auto Colorimetric Cd Reduction	"	28 days
Nitrite	10	NA	353.3	Auto Colorimetric Diazotization	"	48 hours
Nitrogen, Kjeldahl	100	%TS Dependent	351.2	BD, Auto Colorimetric Salicylate	"	28 days
OrthoP	10	NA	365.1	Auto Colorimetric Ascorbic Acid Reduction	"	48 hours
Phenolics	10	0.4	420.2/9066	Manual Dist., Auto Colorimetric 4AAP	500 mL glass	"
Phosphorous, Total	10	%TS Dependent	365.4	BD, Auto Colori. Ascorbic Acid Reduc.	500 mL plastic	28 days
Residue	20,000	NA	160.1	Total Filt-TDS 180C	"	7 days
Residue	4000	NA	160.2	Non Filt-Susp. Sol. 105C	"	"
Sulfate	2000	NA	375.2	Auto Color. Methylthymol Blue	"	"
Sulfide	20	NA	376.2	Methylene blue	250 mL plastic	7 days
TOC	500	NA	415.2	UV/Persulfate	500 mL plastic	28 days
Turbidity	1.0 #	NA	180.1	Nephelometric	"	48 hours
Oil & Grease	10,000	NA	1664	Solid Phase Extraction	2-250 mL glass	28 days

[1]EPA Methods for Chemical Analysis of Water and Wastes / SW-846 EPA Test Methods for Evaluating Solid Waste
[2]Standard Methods for the Examination of Water and Wastewater
* = umhos/cm
# = NTU
~ = absorbance units
NA = Not Available

Calculate = Value is calculated from existing data
DO Probe = Dissolved Oxygen (YSI) Probe
Cd Reduc. = Cadmium Reduction
BD = Block Digester
Man. Dist.= Manual Distillation
Color. = Colorimetric

4AAP = 4 Amino Antipyrene
BOD = Biochemical Oxygen Demand
COD = Chemical Oxygen Demand
TOC = Total Organic Carbon
TDS = Total Dissolved Solids
Auto Dist.= Automated Distillation

Table 1: ENVIRONMENTAL REPORTING LIMITS(RL) FOR DEQ-ESSD LABORATORY SECTION

VOLATILE ORGANICS Method TO-15	Air Reporting Limits (ppbv)	Air Reporting Limits (ug/M3)	Air Containers
Dichlorodifluoromethane	0.3	1.5	6L Canister
Chloromethane	0.3	0.6	"
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.3	2.1	"
1,3-Butadiene	0.3	0.7	"
Vinyl Chloride	0.3	0.8	"
Bromomethane	0.3	1.1	"
Chloroethane	0.3	0.8	"
Acetonitrile	1.0	1.7	"
Trichlorofluoromethane	0.3	1.7	"
Acrylonitrile	0.5	1.1	"
1,1-Dichloroethylene	0.3	1.2	"
Methylene Chloride	0.3	1.0	"
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.3	2.3	"
Trans-1,2-Dichloroethylene	0.3	1.2	"
1,1-Dichloroethane	0.3	1.2	"
Methyl Tert-Butyl Ether	0.5	1.8	"
Methyl Ethyl Ketone	5.0	14.5	"
2-Chloro-1,3-Butadiene	0.3	1.1	"
Cis-1,2-Dichloroethylene	0.3	1.2	"
Hexane	1.0	3.5	"
Chloroform	0.3	1.4	"
1,2-Dichloroethane	0.3	1.2	"
1,1,1-Trichloroethane`	0.3	1.6	"
Benzene	0.3	0.9	"
Carbontetrachloride	0.3	1.9	"
1,2-Dichloropropane	0.3	1.4	"
Bromodichloromethane	0.3	2.0	"
Trichloroethylene	0.3	1.6	"
2,2,4-Trimethylpentane	0.3	1.4	"
Cis-1,3-Dichloropropylene	0.3	1.3	"
Methyl Isobutyl Ketone	1.0	4.0	"
Trans-1,3-Dichloropropylene	0.3	1.3	"
1,1,2-Trichloroethane	0.3	1.6	"
Toluene	0.3	1.1	"
Dibromochloromethane	0.3	2.5	"
1,2-Dibromoethane	0.3	2.3	"
Tetrachloroethylene	0.3	2.0	"
Chlorobenzene	0.3	1.4	"
Ethylbenzene	0.3	1.3	"
m&p-Xylene	0.3	1.3	"
Bromoform	0.3	3.0	"
Styrene	0.3	1.3	"
1,1,2,2-Tetrachloroethane	0.3	2.0	"
o-Xylene	0.3	1.3	"
1,3,5-Trimethylbenzene	0.3	1.4	"
1,2,4-Trimethylbenzene	0.3	1.4	"
Benzyl Chloride	0.3	1.5	"
1,3-Dichlorobenzene	0.3	1.8	"
1,4-Dichlorobenzene	0.3	1.8	"
1,2-Dichlorobenzene	0.3	1.8	"
1,2,4-Trichlorobenzene	0.3	2.2	"
Hexachloro-1,3-Butadiene	0.3	3.1	"

Table 1: ENVIRONMENTAL REPORTING LIMITS (RL) FOR DEQ-ESSD LABORATORY SECTION

Aldehydes Method TO-11	**Air** Reporting Limits (ug)	Containers Hold Time
Formaldehyde	0.30	DNPH Cartridges
Acetaldehyde	0.30	14 Days for Extraction
Acetone	0.30	"
Propionaldehyde	0.30	"
Crotonaldehyde	0.30	"
n-Butyraldehyde	0.30	"
Benzaldehyde	0.40	"
Isovaleraldehyde	0.40	"
Valeraldehyde	0.40	"
o-Tolualdehyde	0.40	"
m,p-Tolualdehyde	0.40	"
Hexanaldehyde	0.40	"
2,5-Dimethylbenzaldehyde	0.40	"

Method 8260SIM	Water Reporting Limits (ug/L)	Sediment/Soil Reporting Limits (ug/Kg)	Water Containers & Hold Times	Sediment/Soil* Containers & Hold Times
1,4-Dioxane	1.00	250	2 - 40mL glass vial w/Teflon Septum HCL pH<2 14 days HT	40mL tared glass vial 10grams sample in 10mL MeOH w/teflon septum 14 days HT

* Analysis may be taken from same MeOH container as volatiles or GRO analysis.

Modified Method 8260	Water Reporting Limits (ug/L)	Sediment/Soil Reporting Limits (ug/Kg)	Water Containers & Hold Times	Sediment/Soil* Containers & Hold Times	GRO Analysis not yet available
Gasoline Range Organics (GRO)	?	?	2 - 40mL glass vial w/Teflon Septum HCL pH<2 14 days HT	40mL tared glass vial 10grams sample in 10mL MeOH w/teflon septum 14 days HT	

* Analysis may be taken from same MeOH container as volatiles or GRO analysis.

Method 8015	Water Reporting Limits (ug/L)	Sediment/Soil Reporting Limits (ug/Kg)	Water Containers & Hold Times	Sediment/Soil* Containers & Hold Times	DRO/ORO Analysis not yet available
DRO (Diesel Range Organics)	?	?	2 - 1000mL glass amber bottles 7 days HT	1 - 8 ounce glass 14 days HT	
ORO (Oil Range Organics)	?	?			