Permit Guidance 9 **Final**	**Limits Below Quantification Levels**	
	Rule reference: OAC 3745-33-07(C)	Revision 0 September 22, 1998 Revision 1 November 8, 2010 Revision 2 February 18, 2015

Basic concepts (detection and quantification levels) -

All analytical methods and systems have a certain level of "noise" associated with them. This "noise" is due to random variations in the analytical and detection components of the system. When testing for contaminants at low concentrations, there is a point where the method's results cannot be distinguished from the "noise" level of the analytical system. The NPDES permitting program needs a defined technique to determine whether a contaminant has been detected, or whether the result may have been just "noise". Compliance tracking of these permits also requires that we know what the reported concentration of the contaminant is with a defined degree of certainty.

The Method Detection Limit (MDL) is the basic measure of whether a pollutant parameter has been detected. It's the minimum concentration at which we can be confident that the effluent concentration is greater than zero. The Quantification Level (QL) is the minimum concentration at which we can be confident that the numerical result is accurate. Minimum Level (ML) and Practical Quantification Level (PQL) are specific ways to measure the QL.

Ohio law requires that the director use PQL as the quantification level in NPDES permits, and sets PQL at 5 times the MDL for the most sensitive test method (ORC 6111.13). This statute also allows the director to set other PQLs based on a national consensus standard or other generally accepted standard. In the Lake Erie Basin, ML is a generally accepted standard, having been approved by all of the Great Lakes states as a condition of the Great Lakes Initiative rule making.

Ohio River Basin -

PQL is set as 5 times the MDL for the most sensitive analytical method. A summary list of PQLs is attached. A discharger may be required to conduct a source investigation (see specific conditions in the compliance tracking section below).

Lake Erie Basin -

The Great Lakes Initiative Rule introduced the concept of Minimum Level as a new measure of quantification. It is more explicitly tied to calibration standards than PQL. PQL is more of an uncertainty factor to deal with analytical results in which we are certain of the detection of a pollutant, but are uncertain about the accuracy of the quantification. For a given method, ML is usually a lower concentration than PQL. MLs are developed by USEPA, and published in draft or final versions of 40 CFR Part 136.

First, the Ohio rule referenced above specifies that the most sensitive method be used to establish the quantification level. This may or may not be the method on which an ML is based. You will need to use the more stringent of ML or PQL to establish quantification levels for the most sensitive method. The attached list has quantification levels for most pollutants.

The discharger must also conduct a pollutant minimization program (PMP) for any pollutant that has limits less than the QL. See OAC 3745-33-09 and the compliance tracking section below.

Statewide Provisions -

Permit language for quantification levels is attached. If the permit is in the Ohio River basin just delete the column for MLs. In the Lake Erie basin, just put 'NA' in the column for whichever QL you're not using.

Analytical methods for NPDES permit parameters must be the methods in 40 CFR Part 136, unless the parameter has no approved method. (Part III specifically references Part 136 methods.) For parameters with no method listed in 40 CFR 136, we must cite a specific method (usually in Part II of the permit).

The rule covers only QLs for water-quality-based effluent limits (because that's all that the GLI addressed). A discharger can still get QLs for technology-based limits under the more general provisions of ORC 6111.13. If the requested QL is for a federal guideline limit, USEPA may need to review the justification as well because effluent guidelines normally incorporate detection/quantification limits during rule development.

Obtaining Approval for Discharge-specific QLs (DS-QLs) –

Discharge- or matrix-specific QLs must be justified by the permittee and approved by Ohio EPA's Division of Environmental Services before they can be included as conditions in NPDES permits or Director's Final Findings and Orders.

Determining Compliance Using OEPA QLs -

For the purposes of assessing compliance, all sample results less than the QL are considered to be in compliance. Detected concentrations less than the QL should be reported on the monthly operating report as the concentration given by the laboratory. To assess compliance with average limits, consider all reported values less than the QL as zero (see OAC 3745-33-07(C) for details). Ohio's compliance tracking software includes QLs as the compliance level, and this information is reflected in the data reported to U.S. EPA.

For the Lake Erie basin, the discharger must conduct a Pollutant Minimization Program for any pollutant that has a WQBEL less than the QL. The rules for conducting PMPs are located in OAC 3745-33-09; these rules also contain provisions for getting out of PMPs, if the discharger can show that the discharge can comply with the WQBEL, even though it can't be quantified.

For the Ohio River basin, ORC 6111.13 allows us to require a discharger to conduct a source

identification for pollutants that are routinely detected between the MDL and QL. A requirement to identify possible pollutant sources may be included at the time of permit issuance or the issuance of DFFOs, and will be based upon any of the following factors:

1. The discharge limit included in the permit is less than 10% of the OEPA PQL value for that parameter.

2. The pollutant can pose significant risks to the environment or human health (e.g., bioaccumulation in the food chain).

3. A reasonable methodology to inventory possible pollutant sources exists thereby making potential reduction strategies possible (e.g., industrial process line testing, municipal sewer user surveys and testing).

4. Other significant factors.

Applying OEPA QLs in Director's Final Finding and Orders (DFFOs) and Consent Decrees -

1. Ohio EPA shall include the following narrative should an interim permit limitation be below the corresponding OEPA QL:

> "The discharger shall be considered in compliance with the referenced effluent limitations provided the effluent quality is less than or equal to the corresponding OEPA QL as determined by rule 3745-33-07(C) of the Ohio Administrative Code."

2. Should effective DFFOs, or consent decrees, contain interim effluent limitations below the corresponding OEPA QL, the Division of Surface Water district staff will use the compliance assessment procedures in OAC 3745-33-07(C) for evaluating compliance with the effluent limits at or below the OEPA QL.

3. In order to make compliance tracking of interim effluent limitations more efficient, Ohio EPA may opt to include the OEPA QL as the interim limitation in DFFOs or consent decrees when an NPDES permit contains effluent limitations less than the OEPA QL. This will minimize the necessity to manually track compliance on these parameters. In this case, the DFFOs or consent decree will include the following statement in the findings:

> "Ohio EPA has included interim effluent limitations at the OEPA QL level in attachment __. The inclusion of these limitations in no way precludes the Director's ability to require the identification of sources of these pollutants, or the requirement to perform any other actions that the Director may specify by rule, under his authority granted by ORC 6111.13."

Whenever the permit is renewed, however, the effluent limit below QL must be

changed to the actual wasteload allocation number to comply with the rules.

QL Permit Paragraph

The parameters below have had effluent limitations established that are below the Ohio EPA Quantification Level (OEPA QL) for the approved analytical procedure promulgated at 40 CFR 136. OEPA QLs may be expressed as Practical Quantification Levels (PQL) or Minimum Levels (ML).

Compliance with an effluent limit that is below the OEPA QL is determined in accordance with ORC Section 6111.13 and OAC Rule 3745-33-07(C). For maximum effluent limits, any value reported below the OEPA QL shall be considered in compliance with the effluent limit. For average effluent limits, compliance shall be determined by taking the arithmetic mean of values reported for a specified averaging period, using zero (0) for any value reported at a concentration less than the OEPA QL, and comparing that mean to the appropriate average effluent limit. An arithmetic mean that is less than or equal to the average effluent limit shall be considered in compliance with that limit.

The permittee must utilize the lowest available detection method currently approved under 40 CFR Part 136 for monitoring these parameters.

REPORTING:

All analytical results, even those below the OEPA QL (listed below), shall be reported. Analytical results are to be reported as follows:

1. Results above the QL: Report the analytical result for the parameter of concern.

2. Results above the MDL, but below the QL: Report the analytical result, even though it is below the QL.

3. Results below the MDL: Analytical results below the method detection limit shall be reported as "below detection" using the reporting code "AA".

The following table of quantification levels will be used to determine compliance with NPDES permit limits (examples):

Parameter	PQL	ML
Chlorine, tot. res.	0.050 mg/L	--
Bis(2-ethylhexyl)phthalate	--	10 µg/L

This permit may be modified, or, alternatively, revoked and reissued, to include more stringent effluent limits or conditions if information generated as a result of the conditions of this permit indicates the presence of these pollutants in the discharge at levels above the WQBEL.

CONVENTIONAL PARAMETERS

Parameter	PQL	Method Basis	ML	Method Basis
Ammonia-N	0.05 mg/L	EPA 350.1	0.01 mg/L	EPA 350.1
BOD_5	--	--	NA	NA
$CBOD_5$	--	--	NA	NA
COD	--	--	5 mg/L	EPA 410.2
Chlorine, TR	0.050 mg/L	(A)	0.1 mg/L	EPA 330.3/330.4
Cyanide, free	0.0025 mg/L	(B)	0.0020 mg/L	(B)
Cyanide, total	0.025 mg/L	EPA 335.3	0.005 mg/L	EPA 335.3
Fluoride	0.25 mg/L	EPA 340.3	0.005 mg/L	EPA 340.3
Hardness	50 mg/L	(C)	10 mg/L	EPA 130.1
TKN	--	--	0.030 mg/L	EPA 351.4
MBAS	0.125 mg/L	EPA 425.1	0.025 mg/L	EPA 425.1
Nitrate	0.5 mg/L	EPA 352.1	0.1 mg/L	EPA 352.1
Nitrate/Nitrite	0.05 mg/L	EPA 353.1/353.3	0.01 mg/L	EPA 353.1/353.3
Nitrite	0.05 mg/L	EPA 354.1	0.01 mg/L	EPA 354.1
Oil & Grease	5 mg/L	(C)	5 mg/L	EPA 413.1
Organic Carbon (TOC)	2 mg/L	(C)	1 mg/L	EPA 415.1
Phosphorus	0.05 mg/L	EPA 365.1/365.4	0.01 mg/L	EPA 365.1/365.4
TDS	50 mg/L	(C)	10 mg/L	EPA 160.1
TSS	--	--	4 mg/L	EPA 160.2
Settleable Solids	--	--	0.2 ml/L	EPA 160.5
Sulfate	5.0 mg/L	EPA 375.4	1.0 mg/L	EPA 375.4
Sulfide	--	--	1.0 mg/L	EPA 376.1

(A) - Based on Standard Method 4500-Cl E.
(B) - Based on U.S EPA Method OIA-1677-09 and ASTM Method D7237-10.
(C) - Based on Ohio EPA detection limit study using USEPA method listed in ML column.

METAL PARAMETERS (µg/L)

Parameter	PQL	Method Basis	ML	Method Basis
Aluminum	15	EPA 202.2	20	EPA 202.2
Antimony	1.0	EPA 204.1	1.0	EPA 204.1
Arsenic	5.0	EPA 206.2	2.0	EPA 206.3
Barium	5.0	EPA 200.7	3.0	EPA 200.7
Beryllium	1.0	EPA 210.2	1.0	EPA 200.7/210.2
Boron	15	EPA 200.7	10	EPA 200.7
Cadmium	0.5	EPA 213.2	0.5	EPA 213.2
Calcium	50	EPA 200.7/215.1	20	EPA 200.7
Chromium, Hex.	7.5	(D)	10	EPA 218.4
Chromium	5	EPA 218.2/218.3	5	EPA 218.2
Cobalt	5	EPA 219.2	5	EPA 200.7/219.2
Copper	5	EPA 220.2	5	EPA 220.2
Gold	5	EPA 231.2	5	EPA 231.2
Iridium	15	EPA 235.1	20	EPA 235.1
Iron	5	EPA 236.2	5	EPA 236.2
Lead	5	EPA 239.2	5	EPA 239.2
Magnesium	5	EPA 242.1	20	EPA 242.1
Manganese	1	EPA 243.2	1	EPA 243.2
Mercury	0.001	EPA 1631	0.0005	EPA 1631
Molybdenum	5	EPA 246.2	3	EPA 246.2
Nickel	5	EPA 249.2	5	EPA 249.2
Osmium	100	EPA 252.2	50	EPA 252.2
Palladium	25	EPA 253.2	20	EPA 253.2
Platinum	100	255.2	100	EPA 255.2
Potassium	50	EPA 258.1	100	EPA 258.1
Rhodium	25	EPA 265.2	20	EPA 265.2
Ruthenium	100	EPA 267.2	100	EPA 267.2
Selenium	10	EPA 270.2/270.3	5	EPA 270.2
Silver	1	EPA 272.2	1	EPA 272.2
Sodium	100	EPA 273.1	30	EPA 273.1

Parameter	PQL	Method Basis	ML	Method Basis
Thallium	5	EPA 279.2	5	EPA 279.2
Tin	25	EPA 282.2	20	EPA 200.7/282.2
Titanium	50	EPA 283.2	1	EPA 200.7
Vanadium	20	EPA 286.2	10	EPA 200.7/286.2
Zinc	0.25	EPA 289.2	0.2	EPA 289.2

(D) - Based on Ohio EPA detection limit study using Standard Method 3500-Cr D.

VOLATILE ORGANIC PARAMETERS (µg/L)

Parameter	PQL	Method Basis	ML	Method Basis
Acetone	--	--	50	EPA 1624
Acrolein	3.5	EPA 603	50	EPA 1624
Acrylonitrile	2.5	EPA 603	50	EPA 1624
Benzene	1.0	EPA 602	10	EPA 1624
Bromobenzene	2.5	(G)	--	--
Bromochloromethane	2.5	(G)	10	EPA 1624
Bromodichloromethane	0.5	EPA 601	10	EPA 1624
Bromofluorobenzene	--	--	10	EPA 1624
Bromoform	1.0	EPA 601	10	EPA 1624
Bromomethane	6.0	EPA 601	50	EPA 1624
2-Butanone (MEK)	--	--	50	EPA 1624
n-Butylbenzene	2.5	(G)	--	--
sec-Butylbenzene	2.5	(G)	--	--
tert-Butylbenzene	2.5	(G)	--	--
Carbon Tetrachloride	0.6	EPA 601	10	EPA 1624
Chlorobenzene	1.0	EPA 602	10	EPA 1624
Chloroethane	2.5	(G)	50	EPA 1624
2-Chloroethyl vinyl ether	0.65	EPA 601	10	EPA 1624
Chloroform	0.25	EPA 601	10	EPA 1624
Chloromethane	0.4	EPA 601	50	EPA 1624
2-Chlorotoluene	2.5	(G)	--	--
4-Chlorotoluene	2.5	(G)	--	--
Dibromochloromethane	0.4	EPA 601	10	EPA 1624
1,2-Dibromo-3-chloropropane	2.5	(G)	--	--
1,2-Dibromoethane	2.5	(G)	--	--

Parameter	PQL	Method Basis	ML	Method Basis
Dibromoethane	2.5	(G)	--	--
1,2-Dichlorobenzene	0.75	EPA 601	10	EPA 1625
1,3-Dichlorobenzene	1.6	EPA 601	10	EPA 1625
1,4-Dichlorobenzene	1.2	EPA 601	10	EPA 1625
Dichlorodifluoromethane	9.0	EPA 601	10	EPA 1624
1,1-Dichloroethane	0.35	EPA 601	10	EPA 1624
1,2-Dichloroethane	0.15	EPA 601	10	EPA 1624
1,1-Dichloroethylene	0.65	EPA 601	10	EPA 1624
cis-1,2-Dichloroethylene	2.5	(G)	--	--
trans-1,2-Dichloroethylene	0.5	EPA 601	10	EPA 1624
1,2-Dichloropropane	0.2	EPA 601	10	EPA 1624
1,3-Dichloropropane	2.5	(G)	--	--
2,2-Dichloropropane	2.5	(G)	--	--
1,1-Dichloropropene	2.5	(G)	--	--
cis-1,3-Dichloropropene	1.7	EPA 601	--	--
trans-1,3-Dichloropropene	1.0	EPA 601	10	EPA 1624
Diethylether	--	--	50	EPA 1624
1,4-Dioxane	--	--	10	EPA 1624
Ethylbenzene	1.0	EPA 602	10	EPA 1624
Isopropylbenzene	2.5	(G)	--	--
Methyl Chloride	1.2	EPA 601	10	EPA 1624
n-Propylbenzene	2.5	(G)	--	--
Styrene	2.5	(G)	10	EPA 1625
1,1,1,2-Tetrachloroethane	2.5	(G)	--	--
1,1,2,2-Tetrachloroethane	0.15	EPA 601	10	EPA 1624
Tetrachloroethylene	0.15	EPA 601	10	EPA 1624
Toluene	0.15	EPA 601	10	EPA 1624

Parameter	PQL	Method Basis	ML	Method Basis
1,2,3-Trichlorobenzene	2.5	(G)	10	EPA 1625
1,1,1-Trichloroethane	0.15	EPA 601	10	EPA 1624
1,1,2-Trichloroethane	0.1	EPA 601	10	EPA 1624
Trichloromethylene	0.6	EPA 601	10	EPA 1624
Trichlorofluoromethane	2.5	(G)	--	--
1,2,3-Trichloropropane	2.5	(G)	--	--
1,2,4-Trimethylbenzene	2.5	(G)	--	--
1,3,5-Trimethylbenzene	2.5	(G)	--	--
Vinyl Chloride	0.9	EPA 601	10	EPA 1624
m-Xylene	2.5	(G)	--	--
o-Xylene	2.5	(G)	--	--
p-Xylene	2.5	(G)	--	--

(G) PQL based on Ohio EPA detection limit study using EPA Methods 601 and 602.

EXTRACTABLE ORGANIC PARAMETERS (µg/L)

Parameter	PQL	Method Basis	ML	Method Basis
Acenaphthene	9.0	EPA 610	10	EPA 1625
Acenaphthylene	11	EPA 610	10	EPA 1625
Anthracene	3.3	EPA 610	10	EPA 1625
Benzidine	0.4	EPA 605	50	EPA 1625
Benzo(a)anthracene	0.065	EPA 610	10	EPA 1625
Benzo(b)fluoranthene	0.09	EPA 610	10	EPA 1625
Benzo(k)fluoranthene	0.085	EPA 610	10	EPA 1625
Benzo(ghi)perylene	0.38	EPA 610	20	EPA 1625
Benzo(a)pyrene	0.11	EPA 610	10	EPA 1625
Biphenyl	--	--	10	EPA 1625
Bis(2-chloroethoxy)methane	2.5	EPA 611	10	EPA 1625
Bis(2-chlororoethyl)ether	1.5	EPA 611	10	EPA 1625
Bis(2-chloroisopropyl)ether	4.0	EPA 611	10	EPA 1625
Bis(2-ethylhexyl)phthalate	10	EPA 606	10	EPA 1625
4-Bromphenyl phenyl ether	9.5	EPA 625	10	EPA 1625
Butylbenzylphthalate	1.7	EPA 606	10	EPA 1625
Carbazole	--	--	20	EPA 1625
4-Chloro-3-methylphenol	1.8	EPA 604(F)	10	EPA 1625
2-Chloronaphthalene	4.7	EPA 612	10	EPA 1625
2-Chlorophenol	1.5	EPA 604(F)	10	EPA 1625
4-Chlorophenyl ether	19	EPA 611	10	EPA 1625
Chrysene	0.75	EPA 610	10	EPA 1625
p-Cymene	--	--	10	EPA 1625
n-Decane	--	--	10	EPA 1625
Dibenzo(ah)anthracene	0.15	EPA 610	20	EPA 1625
Dibenzofuran	--	--	10	EPA 1625

Parameter	PQL	Method Basis	ML	Method Basis
Dibenzothiophene	--	--	10	EPA 1625
3,3-Dichlorobenzidine	0.65	EPA 605	50	EPA 1625
2,4-Dichlorophenol	1.9	EPA 604(F)	10	EPA 1625
Diethylphthalate	2.4	EPA 606	10	EPA 1625
2,4-Dimethylphenol	1.6	EPA 604(F)	10	EPA 1625
Dimethylphthalate	1.4	EPA 606	10	EPA 1625
Di-n-butylphthalate	1.8	EPA 606	10	EPA 1625
2,4-Dinitrophenol	65	EPA 604(F)	50	EPA 1625
2,4-Dinitrotoluene	0.1	EPA 609(E)	10	EPA 1625
Diphenylamine	--	--	20	EPA 1625
Diphenylether	--	--	10	EPA 1625
1,2-Diphenylhydrazine	--	--	20	EPA 1625
Di-n-octylphthalate	12.5	EPA 625	10	EPA 1625
n-Docosane	--	--	10	EPA 1625
n-Dodecane	--	--	10	EPA 1625
n-Eicosane	--	--	10	EPA 1625
Fluoranthene	1.0	EPA 610	10	EPA 1625
Fluorene	1.0	EPA 610	10	EPA 1625
Hexachlorobenzene	0.25	EPA 612	10	EPA 1625
Hexachlorobutadiene	1.7	EPA 612	10	EPA 1625
Hexachlorocyclopentadiene	2.0	EPA 612	10	EPA 1625
Hexachloroethane	0.15	EPA 612	10	EPA 1625
n-Hexacosane	--	--	10	EPA 1625
n-Hexadecane	--	--	10	EPA 1625
Indeno(1,2,3-cd)pyrene	0.21	EPA 610	20	EPA 1625
Isophorone	11	EPA 625	10	EPA 1625
2-Methyl-4,6-dinitrophenol	80	EPA 604(F)	20	EPA 1625

Parameter	PQL	Method Basis	ML	Method Basis
Naphthalene	8.0	EPA 625	10	EPA 1625
beta-Naphthylamine	--	--	50	EPA 1625
Nitrobenzene	9.5	EPA 625	10	EPA 1625
2-Nitrophenol	2.2	EPA 604(F)	20	EPA 1625
4-Nitrophenol	3.5	EPA 604(E)	50	EPA 1625
n-Nitrosodimethylamine	0.75	EPA 607	50	EPA 1625
n-Nitrosodiphenylamine	4.0	EPA 607	20	EPA 1625
n-Nitroso-n-propylamine	2.3	EPA 607	20	EPA 1625
n-Octacosane	--	--	10	EPA 1625
n-Octadecane	--	--	10	EPA 1625
Pentachlorophenol	3.0	EPA 604(E)	50	EPA 1625
Phenanthrene	3.2	EPA 610	10	EPA 1625
Phenol	0.7	EPA 604(F)	10	EPA 1625
alpha-Picoline	--	--	50	EPA 1625
Pyrene	1.3	EPA 610	10	EPA 1625
alpha-Terpineol	--	--	10	EPA 1625
n-Triacontane	--	--	10	EPA 1625
1,2,4-Trichlorobenzene	0.25	EPA 612	10	EPA 1625
2,3,6-Trichlophenol	--	--	10	EPA 1625
2,4,5-Trichlorophenol	--	--	10	EPA 1625
2,4,6-Trichlorophenol	2.9	EPA 604(E)	10	EPA 1625
n-Tetradecane	--	--	10	EPA 1625
n-Tetracosane	--	--	10	EPA 1625

(E) Electron Capture detector
(F) Flame Ionization detector

PESTICIDE, PCB AND DIOXIN COMPOUNDS (µg/L)

Parameter	PQL	Method Basis	ML	Method Basis
Aldrin	0.02	EPA 608	--	--
Chlorodane	0.07	EPA 608	--	--
4,4'-DDD	0.055	EPA 608	--	--
4,4'-DDE	0.02	EPA 608	--	--
4,4'-DDT	0.06	EPA 608	--	--
Dieldrin	0.01	EPA 608	--	--
Endosulfan I	0.07	EPA 608	--	--
Endosulfan II	0.02	EPA 608	--	--
Endosulfan Sulfate	0.33	EPA 608	--	--
Endrin	0.03	EPA 608	--	--
Endrin Aldehyde	0.11	EPA 608	--	--
Heptachlor	0.015	EPA 608	--	--
Heptachlor Epoxide	0.41	EPA 608	--	--
alpha-HCH (alpha-BHC)	0.015	EPA 608	--	--
beta-HCH (beta-BHC)	0.03	EPA 608	--	--
gamma-HCH (lindane)	0.02	EPA 608	--	--
delta-HCH (delta-BHC)	0.045	EPA 608	--	--
Methoxychlor	0.05	(H)	--	--
Mirex	0.05	(H)	--	--
PCB-1016	0.5	(H)	--	--
PCB-1221	0.5	(H)	--	--
PCB-1232	0.5	(H)	--	--
PCB-1242	0.5	(H)	--	--
PCB-1248	0.5	(H)	--	--
PCB-1254	0.5	(H)	--	--
PCB-1260	0.5	(H)	--	--

Parameter	PQL	Method Basis	ML	Method Basis
2,3,7,8-Tetrachlorodibenzo-p-dioxin	10 pg/L	EPA 1613	10 pg/L	EPA 1613
Toxaphene	1.2	EPA 608	--	--

(H) Based on Ohio EPA detection limit study using EPA method 608.