General Procedures for Limitations Development

By

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Division of Water
Surface Water Permits Branch

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SECTION 1

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Pursuant to 401 KAR 5:065, Section 2(4) [40 CFR 122.44], each federally- or delegated state-issued NPDES permit shall include conditions meeting technology-based effluent limitations and standards and water quality standards and state requirements. For new sources or new dischargers, these technology-based limitations and standards are subject to the provisions of 401 KAR 5:065, Section 6 [40 CFR 122.29].

1. TECHNOLOGY-BASED EFFLUENT LIMITATIONS

401 KAR 5:065, Section 2(4) [40 CFR 122.44(a)(1)] requires the imposition of effluent limitations and standards promulgated under Section 301 of the Clean Water Act (CWA), or new source performance standards promulgated under section 306 of the CWA, on a case-by-case determination under Section 402(a)(1) of the CWA, or a combination of the three, in accordance with 401 KAR 5:080, Section 2(3) [40 CFR 125.3]. In accordance with Section 301(b) of the CWA, 401 KAR 5:080, Section 2(3) [40 CFR 125.3] establishes the minimum technology-based treatment requirements which are to be imposed on permits issued under section 402 of the CWA. These standards are divided into two categories: Publicly Owned Treatment Works (POTWs) and dischargers other than POTWs (Industrial).

1.1. Industrial Dischargers

Industrial dischargers are categorized as either an "existing source," "new discharger" or "new source". A "new source" is defined as any building, structure, facility, or installation from which there is or may be a discharge of pollutants, the construction of which commenced: (1) after promulgation of applicable New Source Performance Standards (NSPS) in the Effluent Limitation Guideline (ELG) or (2) after proposal of applicable NSPS requirements in an ELG but only if the standards are promulgated within 120 days of proposal. A "new discharger" is defined as any building, structure, facility, or installation: (1) from which there is or may be a discharge of pollutants, (2) that did not commence the discharge of pollutants at that particular site prior to August 13, 1979, (3) is not a new source, and (4) has never received a finally effective NPDES permit for discharges at that site. An "existing source" is defined as any building, structure, facility or installation from which there is or may be a discharge of pollutants which is not a new source or a new discharger.

BPT is the first level of technology-based standards established by the CWA to control pollutants discharged to waters of the US and is generally based on the average of the best existing performance by plants within an industrial category or subcategory.

BCT are technology-based standards for the discharge of existing industrial point sources of conventional pollutants.

BAT are technology-based standards that are the most appropriate means available on a national basis for controlling the direct discharge of toxic and nonconventional pollutants to navigable waters and generally represent the best existing performance of treatment technologies that are economically achievable within an industrial point source category or subcategory. Toxic pollutant means any pollutant listed as toxic under Section 307(a)(1) or, in the case of sludge use or disposal practices, any pollutant identified in regulations implementing Section 405(d) of the CWA. Nonconventional pollutants are not listed as conventional or toxic pollutants.

Unlike BPT, BCT, and BAT, the imposition of which in permits is authorized by 401 KAR 5:080, Section 2(3) [40 CFR 125.3(a)], NSPS requirements are required by Section 306 of the CWA. 401 KAR 5:080, Section 6 [40 CFR 122.29(d)] establishes the compliance date for achieving the pollutant reduction levels specified by the NSPS. 401 KAR 5:080, Section 6 [40 CFR 122.29(d)(1)] states that a new source which meets the applicable promulgated NSPS before commencement of discharge, may not be subject to any more stringent NSPS or to any more stringent technology-based standards under Section 301(b)(2) of the CWA for the soonest ending of the following periods:

(1) Ten years from the date that construction is completed;
(2) Ten years from the date the source begins to discharge process or other non-construction related wastewater; or

(3) The period of depreciation or amortization of the facility for the purposes of Section 167 or 160 or both of the Internal Revenue Code of 1954.

The following table summarizes the requirements for non-POTW or industrial dischargers.

TECHNOLOGY-BASED TREATMENT REQUIREMENTS FOR INDUSTRIAL DISCHARGERS					
Technology-Based Control Level	**Type of Discharger**	**Type of Pollutant**			**Compliance Deadline**
		Conventional	**Nonconventional**	**Toxic**	
Best Practicable Control Technology Currently Available (BPT)	Direct Existing	X	X	X	July 1, 1977
Best Conventional Pollutant Control Technology (BCT)	Direct Existing	X			March 31, 1989
Best Available Technology Economically Achievable (BAT)	Direct Existing		X	X	March 31, 1989
New Source Performance Standards (NSPS)	Direct New	X	X	X	Commencement of discharge
Pretreatment Standards for Existing Sources (PSES)	Indirect Existing-	X	X	X	Date specified in regulation
Pretreatment Standards for New Sources (PSNS)	Indirect New	X	X	X	Commencement of discharge

Pursuant to 401 KAR 5:080, Section 6 [40 CFR 122.29(d)(2)], the protection afforded by the aforementioned deadlines do not apply to more stringent limits of performance based on the following criteria:

(1) The limitations are not technology-based; or
(2) Additional conditions in accordance with 401 KAR 5:080, Section 2(3) [40 CFR 125.3] controlling toxic pollutants or hazardous substances which are not controlled by NSPS, including those controlling pollutants other than those identified as toxic pollutants or hazardous substances when control of these pollutants has been specifically identified as the method to control the toxic pollutants or hazardous substances.

Section 306(c) provides for a state to develop and submit to the EPA Administrator a procedure under state law for applying and enforcing standards of performance for new sources located in the state. If the Administrator finds the state procedure requires the application and enforcement of standards of performance to at least the same extent as by Section 306 then the state is authorized to apply and enforce those performance standards on new sources in the state, except those owned or operated by the United States.

The PSES and PSNS technology-based effluent requirements are applied by POTWs with an approved Pretreatment Program via local limits and user permits.

1.2. Methods of Imposing

Pursuant to 401 KAR 5:075, Section 1 [40 CFR 122.3(c)], technology-based treatment requirements may be imposed through one of three methods:

(1) The application of EPA promulgated effluent limitations developed under Section 304 of the CWA to dischargers by category or subcategory (i.e., ELGs);
(2) On a case-by-case basis under Section 402(a)(1) of the CWA to the extent that EPA-promulgated effluent limitations are inapplicable. The permit writer shall apply the appropriate factors listed in 401 KAR 5:080, Section 2(3) [40 CFR 125.3(d)] and shall consider (a) the appropriate technology for the category or class of point sources of which the applicant is a member, based upon all available information, and (b) any unique factors relating to the applicant using best professional judgment (BPJ), including, where appropriate, limitations expressed in terms of toxicity;

(3) Through a combination of methods (1) and (2) where promulgated ELGs only apply to (a) certain aspects of the discharger's operation, (b) to certain pollutants, or (c) other aspects or activities are subject to regulation on a case-by-case basis in order to carry out the provisions of the CWA.

1.2.1. Effluent Limitation Guidelines

EPA has developed effluent limitation guidelines (ELGs) for 56 specific point source categories. These guidelines typically referred to as ELGs are found in 401 KAR 5:065, Section 2(9)[Title 40, Chapter I Subchapter N (40 CFR Parts 400 thru 471)]. The ELG typically establishes numeric requirements for one or more of the technology-based requirements discussed under Section 1. These numeric requirements may be in the form of: (1) mass based, production normalized, (2) mass based, flow normalized, (3) concentration based, (4) zero discharge of pollutants, or (5) other numeric limitations, e.g. pH, temperature.

Mass Based, Production Normalized Numeric Limitations

To calculate mass based, production normalized numeric limitations, the formula

$$EL = (LAPR) \times (ELGF)$$

is used, where the following is true:

EL is the calculated effluent limit expressed as lbs/day.

LAPR is the long-term average daily production rate. The LAPR can be expressed in various units such as 1,000 lbs/day, 102 square feet/day, barrels/day, etc. The LAPR is not the maximum or design production rate for the facility but an average daily, average monthly, or other mean production rate. Typically DOW considers long-term to be equivalent to the term of the permit which is usually 5 years.

ELGF is the effluent limit guideline factor found in the ELG and is expressed in various units such as lbs/1000 lbs, lbs/102 square feet, etc.

Mass Based, Flow Normalized Numeric Limitations

To calculate these types of limitations the formula

$$EL = (LAF) \times (ELGF) \times (UCF)$$

is used where the following is true:

EL is the calculated effluent limit expressed as lbs/day.

LAF is the long-term average daily flow and is expressed in terms of million gallons per day (MGD). The LAF is not the maximum or design flow for the facility but an average daily, average monthly, or other mean flow rate. Typically DOW considers long-term to be equivalent to the term of the permit which is usually 5 years.

ELGF is the effluent limit guideline factor found in the ELG and is expressed in mg/l.

UCF is a unit conversion factor equivalent to 8.34 (L-lbs/MG-mg).

Concentration Based, Zero Discharge of Pollutants, and Other Numeric Limitations

These types of limitations are directly applied without modification due to production rate or flow of the facility.

1.2.2. Best Professional Judgment

The second method for the imposition of technology-based effluent limitations is through a process known as BPJ. As previously stated in 4.1.2.1 Methods of Imposing, the BPJ process may be used on a case-by-case basis to the extent that EPA-promulgated effluent limitations are inapplicable. The NPDES permit writers handbook and NPDES permit writers training course states that "promulgated effluent limitations are inapplicable" when: (1) EPA has not developed effluent guidelines that apply to the discharge (industry or

specific process); or (2) there is an applicable effluent guideline, but pollutants or processes are present that were not considered when the effluent guideline was developed.

401 KAR 5:080, Section 2(3)[40 CFR 125.3 (d)] establishes technical criteria for the permit writer to follow in the development of a case-by-case BPJ determination of appropriate technology-based effluent limitations. These procedures are similar to those utilized by EPA to develop national ELGs. The permit writer determines BPT, BCT, and BAT on a case-by-case basis considering any unique factors related to the facility. The permit writer must develop BPT and BCT criteria for conventional pollutants or BPT and BAT criteria for toxic and nonconventional pollutants.

Technical criteria common to BPT, BCT and BAT include: (1) age of equipment and facilities involved; (2) process or processes employed; (3) engineering aspects of the application of various types of control techniques; (4) process changes; and (5) non-water quality environmental impact including energy requirements. Where the BPJ determination differs for these three levels of technology-based standards is in the area of economic criteria. The following table illustrates these differences.

BPJ ECONOMIC CRITERIA	
Required Technology	**Economic Test**
BPT	Total cost in relation to effluent reduction benefits achieved
BCT	Two part test:
	POTW Cost Test – compares the cost-effectiveness of an upgrade by the facility to meet BCT to the benchmark cost-effectiveness of a similar POTW upgrade (from secondary to advanced treatment)
	Industry Cost-Effectiveness Test – compares the ratio of the incremental cost of going beyond BPT and the incremental cost of going from no treatment to BPT to an industry benchmark
BAT	Economic Achievability – determination of whether the cost of achieving the effluent reduction feasible

It should be noted that 401 KAR 5:080, Section 2(3) [40 CFR 125.3 (d)] does not establish technical criteria or economic criteria for the development of a BPJ equivalent of NSPS. Therefore, based on the requirements of Section 306 of the CWA, 401 KAR 5:065, Section 6 [40 CFR 122.29(d)] and 401 KAR 5:080, Section 2(3) [40 CFR 125.3(d)], DOW has concluded that EPA did not intend for the permit writer to develop a BPJ-equivalent of NSPS.

1.2.3. Combination of ELGs and BPJ Determinations

The third option for imposing technology-based limitations is a combination of the application of an ELG and of a BPJ determination of appropriate technology-based effluent limitations. Although EPA has developed and promulgated a significant number of ELGs, these guidelines are not comprehensive of all dischargers or pollutants within a wastestream. For example the ELG for Mineral Mining and Processing Point Source Category (40 CFR 436) does not include effluent limitations for Total Suspended Solids (TSS) for several of the subcategories of mineral mining activities address by the ELG. In such cases DOW develops a BPJ effluent limit for TSS to supplement the requirements of the ELG.

1.2.4. Combined Wastestreams

In many cases a facility may have several wastestreams that are commingled for ease and cost of treatment, known as “co-treatment facilities”. There may be a promulgated ELG for one or more of the wastestreams, there may be wastestreams for which an ELG does not exist, and there may be wastestreams that contain pollutants that EPA did not consider in its analysis when the ELG was being developed and promulgated. In such cases it is necessary for the permit writer to determine an aggregate technology-based effluent on the combined wastestream.

The process for developing an aggregate technology-based effluent is straightforward. The permit writer begins by analyzing each wastestream individually to determine the allowable limits for that wastestream in terms of mass. These allowable limits are then summed to generate an aggregate mass limitation which can be converted to a concentration limitation by using the total flow for the combined wastestreams. The following example illustrates this process.

Example: A discharger commingles three wastestreams in a single treatment unit for ease of treatment. Wastestream one (W_1) is process water subject to an applicable ELG. Wastestream two (W_2) is a non-process wastewater for which no ELG has been developed and promulgated. Wastestream three (W_3) is a pollution-control wastewater that is subject to an applicable ELG; however, the pollutant in question was not addressed by EPA in the development of the ELG.

The permit writer, following the procedures outlined in Sections 1.2.1 and 1.2.2, has determined the contributions from each wastestream for the pollutant of concern is:

W1 = 105 lbs/day
W2 = 20 lbs/day
W3 = 5 lbs/day

Summing the mass loadings of these three wastestreams the aggregate limit is 130 lbs/day, to be applied at the point of discharge. It should be noted that wastestream concentrations are never cumulative.

1.3. Publicly Owned Treatment Works (POTWs)

For POTWs 401 KAR 5:080, Section 2(3) [40 CFR 125.3(a)(1)] requires two categories of technology based effluent standards; Secondary Treatment Standards and Best Practicable Waste Treatment Technology (BPWTT).

1.3.1. Secondary Treatment Standards

Secondary Treatment Standards are defined in 401 KAR 5:080, Section 8 [40 CFR 133]. The following table summarizes these standards.

SECONDARY TREATMENT STANDARDS			
Effluent Characteristic	**30 Day Average**	**7 Day Average**	**Percent Removal**
Biochemical Oxygen Demand (BOD_5)	30 mg/l	45 mg/l	85 %
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	25 mg/l	40 mg/l	85 %
Total Suspended Solids (TSS)	30 mg/l	45 mg/l	85 %
pH	Shall be maintained between 6.0 and 9.0 standard units		

401 KAR 5:080, Section 2(3) [40 CFR 125.3(a)(1)] requires permits for POTWs to include Secondary Treatment Standards from the date of permit issuance.

1.3.2. Special Considerations

401 KAR 5:080, Section 8(4) [40 CFR 133.103] provides for the following special consideration:

Combined Sewers

On a case-by-case basis when a treatment works is unable to meet the percentage removal requirements due to wet weather flows received from combined sewers DOW may establish an alternate percentage removal level.

Industrial Wastes

When a POTW receives wastes from an industrial facility that is subject to an effluent guideline that permits BOD_5 and TSS concentrations less stringent than the secondary treatment standards the values for BOD_5 and TSS may be adjusted provided (a) the permitted discharge of such pollutants, attributable to the industrial category, would not be greater than that which would be permitted under effluent guideline if such industrial category were to discharge directly into the navigable waters, and (b) the flow or loading of such pollutants introduced by the industrial category exceeds 10 percent of the design flow or loading of the publicly owned treatment works.

Waste Stabilization Ponds

The Director may establish alternate TSS concentrations for waste stabilization ponds when (a) the waste stabilization pond is the principal process used for secondary treatment; and (b) operation and maintenance data indicate that secondary treatment levels for TSS cannot be achieved. Such an alternate TSS concentration shall be equal to the effluent concentration achieved 90 percent of the time waste stabilization ponds within the State that are achieving the secondary treatment levels for BOD_5.

Less Concentrated Influent Wastewater for Separate Sewers

For less concentrated influent wastewater for separate sewers a lower percent removal requirement or mass loading limit may be substituted for the secondary treatment percent removal requirements when the permittee satisfactorily demonstrates that (a) The treatment works is consistently meeting, or will consistently meet, its permit effluent concentration limits but its percent removal requirements cannot be met due to less concentrated influent wastewater; (b) to meet the percent removal requirements, the treatment works would have to achieve significantly more stringent limitations than would otherwise be required by the concentration- based standards; and (c) The less concentrated influent wastewater is not the result of excessive I/I. The determination of whether the less concentrated wastewater is the result of excessive I/I will use the definition of excessive I/I plus the additional criterion that inflow is non-excessive if the total flow to the POTW (i.e., wastewater plus inflow plus infiltration) is less than 275 gallons per capita per day.

Less Concentrated Influent Wastewater for Combined Sewers During Dry Weather

For less concentrated influent wastewater for combined sewers during dry weather a lower percent removal requirement or mass loading limit may be substituted for the secondary treatment percent removal requirements when the permittee satisfactorily demonstrates that (a) the treatment works is consistently meeting, or will consistently meet, its permit effluent concentration limits, but the percent removal requirements cannot be met due to less concentrated influent wastewater; (b) to meet the percent removal requirements, the treatment works would have to achieve significantly more stringent effluent concentrations than would otherwise be required by the concentration-based standards; and (c) the less concentrated influent wastewater does not result from either excessive infiltration or clear water industrial discharges during dry weather periods. The determination of whether the less concentrated wastewater results from excessive infiltration plus the additional criterion that either 40 gallons per capita per day (gpcd) or 1500 gallons per inch diameter per mile of sewer (gpdim) may be used as the threshold value for that portion of the dry weather base flow attributed to infiltration. If the less concentrated influent wastewater is the result of clear water industrial discharges, then the treatment works must control such discharges pursuant to 401 KAR 5:080, Section 6 [40 CFR part 403].

1.3.3. Treatment Equivalent to Secondary Treatment

Treatment works may be eligible for the equivalent to secondary treatment standards summarized in the following table:

EQUIVALENT TO SECONDARY TREATMENT STANDARDS			
Effluent Characteristic	**30 Day Average**	**7 Day Average**	**Percent Removal**
Biochemical Oxygen Demand (BOD_5)	45 mg/l	65 mg/l	65 %
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	40 mg/l	60 mg/l	65 %
Total Suspended Solids (TSS)	45 mg/l	65 mg/l	65 %
pH	Shall be maintained between 6.0 and 9.0 standard units		

The following criteria must be met for a treatment system to be eligible for these technology-based standards:

(1) The BOD_5 and TSS effluent concentrations consistently achievable through proper operation and maintenance (40 CFR 133.101(f)) of the treatment works exceed the minimum level of the effluent quality set forth in 133.102(a) and 133.102(b),

(2) A trickling filter or waste stabilization pond is used as the principal process, and

(3) The treatment works provide significant biological treatment of municipal wastewater.

1.4. Methods of Imposing

The secondary treatment standards are directly imposed in KPDES permits as effluent limitations except when site specific conditions warrant the more stringent water quality-based effluent limitations. Pursuant to 40 CFR 122.45(f) all pollutants in permits shall have limitations expressed in terms of mass unless such limitations are infeasible. The concentration-based secondary treatment requirements are converted to mass-based effluent requirements using the following formula:

$$EL = (DF) \times (ELGF) \times (UCF)$$

EL is the calculated effluent limit expressed as lbs/day.

DF is design capacity of the POTW as per 40 CFR 122.45(b)(1) which requires production-based effluent limitations for POTWs to be calculated using the design flow

ELGF is the effluent limit guideline factor found in the ELG and is expressed in mg/l.

UCF is a unit conversion factor equivalent to 8.34 (L-lbs/MG-mg).

SECTION 2

WATER QUALITY-BASED EFFLUENT LIMITATIONS

2. WATER QUALITY BASED EFFLUENT LIMITATIONS

401 KAR 5:065, Section 2(4) [40 CFR 122.44(d)(1)] requires the imposition of water quality standards and state requirements to consider any requirements in addition to or more stringent than promulgated effluent limitations guidelines or standards under Sections 301, 304, 306, 307, 318 and 405 of the CWA necessary to achieve water quality standards established under Section 303 of the CWA, including state narrative criteria for water quality.

401 KAR 5:065, Section 2(4) [40 CFR 122.44(d)(1)(i)] stipulates that limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality.

When determining whether a discharge causes, has the reasonable potential to cause, or contributes to an instream excursion above a narrative or numeric criteria within a state water quality standard, the permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and where appropriate, the dilution of the effluent in the receiving water, pursuant to 401 KAR 5:065, Section 2(4) [40 CFR 122.44(d)(1)(ii)]. For any discharge causing, having the reasonable potential to cause, or contribute to an instream excursion above the allowable ambient concentration of a state numeric criteria within a state water quality standard for an individual pollutant, the permit must contain effluent limits for that pollutant.

When the permitting authority determines that a discharge causes, has the reasonable potential to cause, or contributes to an instream excursion above the numeric criterion for whole effluent toxicity, the permit must contain effluent limits for whole effluent toxicity.

401 KAR 5:065, Section 2(4) [40 CFR 122.44(d)(1)(vi)] requires the permitting authority to establish effluent limits for a specific chemical that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contribute to an excursion above a narrative criterion within the state water quality standard.

2.1. Reasonable Potential Analysis

In late 1999 and early 2000, the Division of Water (DOW) documented its procedures for conducting a reasonable potential analysis. In June 2000, this documentation entitled *Permitting Procedures for Determining Reasonable Potential* (Natural Resources and Environmental Protection Cabinet, Division of Water, May 1, 2000) was submitted to EPA Region IV for review. On July 7, 2000, EPA issued a letter approving the Division of Water's procedures. Both chemical-specific numeric and whole effluent toxicity (WET) procedures were developed.

2.1.1. Chemical-Specific Procedures

When conducting a chemical-specific reasonable potential analysis DOW must first determine the pollutants of concern. Depending on the type of facility being permitted, the wastewaters discharged and the source of the pollutants, this analysis may be performed on a select number of pollutants or may be performed on the entire list of water quality standards found in 401 KAR 10:031. DOW determines the pollutants of concern through the review of the permit application, applicable effluent guidelines, the water quality standards, Discharge Monitoring Reports (DMRs) for existing facilities, etc. For municipal permits this review will include verification of industrial user contribution and, for those with approved pretreatment programs, toxic scans of influent, effluent, and sludge in addition to audits and inspections.

2.1.2. Numeric Procedures

If DOW determines that a promulgated Effluent Limitation Guideline (ELG) applies or has developed limits for a pollutant based upon its Best Professional Judgment (BPJ), then reasonable potential is considered to exist and effluent limitations and monitoring are imposed in the permit. For pollutants where neither an ELG nor BPJ developed limits apply DOW shall develop a Waste Load Allocation (WLA) for the pollutant to determine if reasonable potential exists. DOW utilizes one or more of the computer models in subsequent sections to develop WLAs, taking into account site-specific background receiving water conditions.

The models use actual or predicted background data and discharge data. In running these models, DOW considers five (5) data points as sufficient dataset in most cases. In cases where insufficient data is available, DOW may condition the permit to include a monitoring-only requirement to generate the data; to require additional data collection prior to the development of the permit; or, in cases where the pollutant concentration in the wastewater is not highly variable, a single data point may be used. While most effluents exhibit a lognormal distribution relative to concentrations of constituents being released, DOW has elected not to assume any coefficient of variation for the data set and instead prefers to use the average concentration or loading as indicative of future discharge.

The output of the WLA is compared to the discharge quality to determine reasonable potential using the following criteria: If the average discharge quality is less than 70% of the WLA then monitoring may not be required; if within the range of 70% to 90% then monitoring shall be required; if greater than 90% then a limit shall be required. In the case where insufficient data, i.e. less than 5 data points, exists, or where predicted values were used the permit shall require monitoring for the pollutants at a frequency of once per month for the first year at the end of which a new reasonable potential analysis shall be conducted and the permit may be reopened to modify the conditions.

2.1.3. Narrative Procedures

DOW uses site-specific effluent and receiving water data to determine if the discharge has reasonable potential to cause or contribute to an in-stream excursion above a narrative criterion. Effluent data required may include but is not limited to average and design flows, chemical-specific concentrations and loads, whole effluent toxicity data, and other data deemed appropriate by DOW. Receiving water data includes but is not limited to average and critical flows, chemical-specific concentrations, stream morphology and when appropriate biological community data. When sufficient data is unavailable to conduct a reasonable potential analysis DOW may require the permittee to collect the necessary data prior to the development of the permit or condition the permit to include a requirement to generate the data.

Where DOW determines reasonable potential may exist for a discharge to cause or contribute to an excursion above a narrative water quality standard effluent limitations for whole effluent toxicity are imposed pursuant to 40 CFR 122.44(d)(1)(v) unless it can be demonstrated that chemical-specific limitations for the effluent are sufficient to attain and maintain applicable narrative water quality standards. The application of chemical-specific limitations may be in the form of an indicator parameter or parameters that DOW has determined will sufficiently control the discharge such that the narrative water quality criterion is met and maintained [40 CFR 122.44(d)(1)(vi). Appropriate effluent and ambient receiving water monitoring shall be included in the permit to demonstrate the narrative criterion is being met and maintained.

In cases where numerical limitations on an indicator parameter are infeasible DOW may require the implementation of site-specific best management practices (BMPs) to insure compliance with the narrative standards (40 CFR 122.44(k)).

2.1.4. Whole Effluent Toxicity Procedures

Complex wastestreams have a number of variable contributing sources which may be individually toxic or collectively act synergistically to cause toxicity and therefore present a reasonable potential to cause or contribute to instream toxicity. Those industrial and municipal facilities which have been rated as "majors" using EPA's major rating protocols, municipalities with approved pretreatment programs, and industrial dischargers with complex wastestreams are considered to have a reasonable potential by DOW and therefore have whole effluent toxicity (WET) testing included in the permit.

Additionally, 401 KAR 5:065, Section 2(4) [40 CFR 122.44(d)(vi)(C)] allows for the establishment of limits on an indicator parameter for narrative water quality standards. 401 KAR 10:031, Section 4 (1)(f) and (g) include Kentucky's narrative standards for TDS or SC and TSS respectively, which should not be changed to the extent that the indigenous aquatic community is affected. Coupled with site-specific biological surveys, DOW uses WET testing as an indicator parameter for these pollutants.

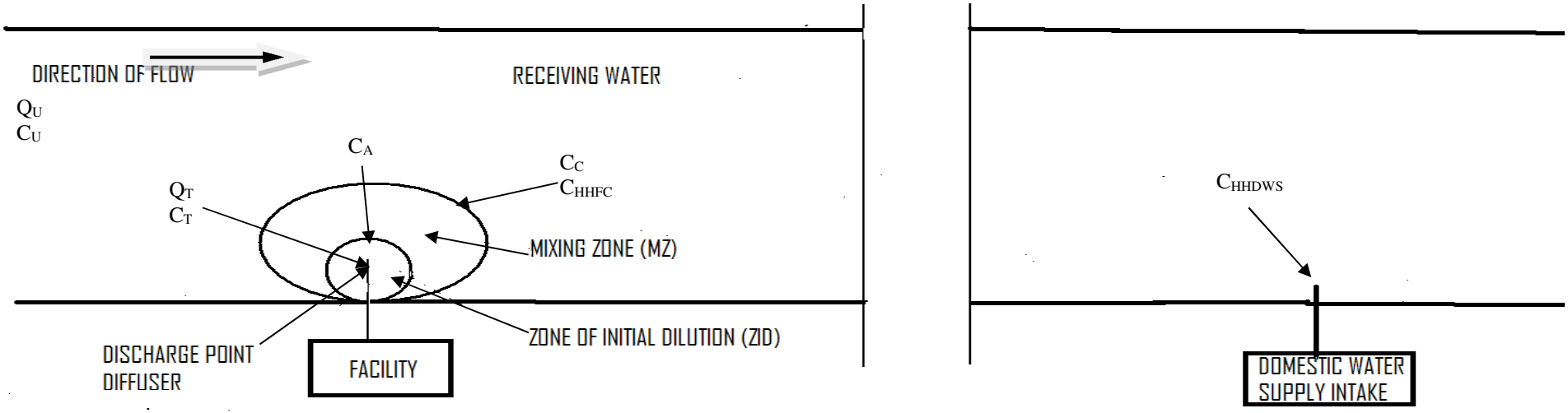
2.2. Derivation of Limitations

2.2.1. Chemical-specific Criteria

The allowable instream concentrations for specific pollutants are found in 401 KAR 10:031, Section 6(1) Table 1. These water quality criteria are divided into the categories of those for the protection of human health and aquatic life. These categories are further divided into the subcategories of Domestic Water Supply (C_{HHDWS}) and Fish Consumption (C_{HHFC}) for human health and Acute Criteria (C_A) and Chronic Criteria (C_C) for aquatic life. Section 4(2) of 401 KAR 10:029 specify the points within the receiving stream where A_C, C_C, and C_{HHFC} criteria apply. The point where DWS criteria apply is specified by 401 KAR 10:031, Section 3. This section also specifies the stream flows that are used in derivation of water quality based effluent limitations. The following illustration summarizes these requirements.

CHEMICAL-SPECIFIC CRITERIA APPLICATION CONDITIONS			
Criteria	**Sub-Criteria**	**Point of Application**	**Stream Flow**
Aquatic Life	Acute	No Diffuser – End-of-pipe	Not applicable
		Diffuser – Edge of the ZID Receiving Water	7Q10
	Chronic	Edge of Mixing Zone Receiving Water	7Q10
Human Health	Fish Consumption	Edge of Mixing Zone Receiving Water	Harmonic Mean
	Domestic Water Supply	Point of Withdrawal Intake Water	Carcinogen – Harmonic Mean
			Non-Carcinogen – 7Q10

The following figure illustrates the application points for these criteria.



C_A – Acute criteria for aquatic life

C_C – Chronic criteria for aquatic life

C_{HHDWS} - Human Health criteria domestic water supply

C_{HHFC} - Human Health criteria fish consumption

C_T – End-of-pipe effluent limit

C_U – Background pollutant concentration

Q_T – Total Effluent Flow

Q_U – Upstream Flow

Mass-balance Equation

The chemical-specific water quality limitations are calculated using the following mass-balance equation:

$$(C_U)(Q_U)+(C_T)(Q_T)=(C_D)(Q_U+Q_T)$$

Where:

C_D = pollutant concentration downstream (water quality criteria)
C_T = End-of-pipe effluent limit
C_U = pollutant concentration upstream (stream background condition)
Q_T = wastewater flow
Q_U = receiving stream flow upstream

Solving the equation for C_T first requires rearranging the equation as

$$C_T=\frac{[(C_D)(Q_T+Q_U)-(C_U)(Q_U)]}{Q_T}$$

In the event that the applicable Q_U is zero, $C_T = C_D$.

Mixing Zones and Zones of Initial Dilution

A mixing zone (MZ) is an area where effluent discharge undergoes dilution and is extended to cover the secondary mixing in the ambient waterbody. It is also an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented. 401 KAR 10:029, Section 4 sets forth the requirements for the granting of mixing zones, zones of initial dilution (ZIDs) and the application point of the aquatic life and human health criteria found in Kentucky's Water Quality Standards at 401 KAR 10:031. 401 KAR 10:029, Section 4(1) establishes requirements for the granting of an MZ, and Section 4(2) establishes the points of application for the aquatic life and human health criteria and the requirements and restrictions associated with a ZID.

When granting an MZ, DOW must assign definable geometric limits including the linear distance from the point of discharge, the surface area involved, and the volume of the receiving water, and shall take into account other nearby MZs. For streams and rivers, the assigned MZ shall not exceed 1/3 of the width of the waterbody nor 1/2 of the waterbody's cross-sectional area in any spatial direction. For lakes and reservoirs, the assigned MZ shall not exceed 1/10 of width of the waterbody in any spatial direction. The MZ shall not adversely affect the designated uses of the receiving stream nor adversely affect an established community of aquatic organisms. The location of an MZ shall not interfere with fish spawning or nursery areas, fish migration routes, public water supply intakes, or bath areas; preclude the free passage of fish or aquatic life, or jeopardize the continued existence of endangered or threatened aquatic species or result in the destruction or adverse modification of their critical habitat. Unless assigned by the Cabinet on or before September 8, 2004, there shall be no MZ for bioaccumulative chemicals of concern. Existing MZs assigned by the Cabinet for bioaccumulative chemicals of concern shall expire no later than September 8, 2014. The dilution afforded by an MZ is not allowed unless the applicant requests an MZ and DOW assigns the geometric limits.

A ZID is a regularly-shaped area surrounding the discharge structure that encompasses the regions of high pollutant concentrations under design conditions. ZIDs are restricted to facilities with a submerged high-rate multi-port outfall structure (diffuser). Within the ZID, acutely-toxic concentrations may exist; as such, the acute criteria must be met at the edge of the defined ZID. When determining the size of the ZID, DOW evaluates three cases, the most restrictive of which is used to establish the dimensions of the ZID and the allowable dilutions. The three cases that are evaluated are as follows:

(1) within 10% of the distance from the edge of the outfall to the edge of the assigned mixing zone in any spatial direction;
(2) within 50 times the square root of the cross-sectional area of a discharge port in any spatial direction; and
(3) horizontally within 5 times the natural water depth that prevails under mixing zone design conditions, and exists before the installation of a discharge outlet.

Unless assigned on or before December 8, 1999, a ZID for a pollutant shall not be allowed in an Exceptional Water. Like MZs, the dilution afforded by a ZID is not allowed unless the applicant requests a ZID and DOW assigns the geometric limits.

Mixing Zone

When an MZ is granted, the available upstream flow QU is modified by the MZ factor (MZF). The MZF represents the maximum proportion of the flow allowed to be used for the MZ. The mass-balance equation becomes

$$C_T = \frac{[C_D(Q_T + (MZF)(Q_U)) - C_U(MZF)(Q_U)]}{Q_T}$$

Assuming that the depth is much smaller than width and that the flow is therefore width-dependent, the MZF cannot exceed 0.333 for most streams and rivers. For larger rivers, the cross-sectional limitation of 0.5 is allowed, but 0.333 is generally used to be conservative. Because of the low-flow regime present in lake systems, 0.1 is the maximum MZF for lakes. The MZ dilution (MZD) is then defined as product of the MZF and the ratio of the downstream flow to the upstream flow, or

$$MZD = \frac{[(MZF)Q_U + Q_T]}{Q_T}$$

Substituting MZD into the prior equation yields

$$C_T = \left[MZD\left(C_D - C_U\left(\frac{(MZF)Q_U}{Q_T + (MZF)Q_U} \right) \right) \right]$$

In the case where the receiving water flow condition is many times greater than the discharge flow, $\frac{(MZF)Q_U}{(Q_T + (MZF)Q_U)}$ approaches 1, which is a conservative assumption since it results in smaller values of CT. The mass-balance equation can be approximated as

$$C_T = (C_D - C_U)MZD$$

Zone of Initial Dilution

A ZID is granted when a high rate multi-port submerged diffuser is installed on the effluent pipe. In such cases the ZID dilution (ZIDD) is defined as the ratio of the downstream flow to the upstream flow, or

$$ZIDD = \frac{(Q_T + Q_U)}{Q_T}$$

And the mass-balance equation is expressed as

$$C_T = \left[ZIDD\left(C_D - C_U\left(\frac{Q_U}{Q_T + Q_U} \right) \right) \right]$$

In cases where the receiving water flow condition is many times greater than the discharge flow, $\frac{Q_U}{(Q_T + Q_U)}$ approaches 1, which is a conservative assumption since it results in smaller values of CT. The mass-balance equation can be approximated as

$$C_T = (C_D - C_U)\, ZIDD$$

Aquatic Life Criteria

Effluent discharge limitations for a particular constituent for the aquatic live criteria are based on the instream pollutant concentration limits for both acute conditions (CA) and chronic conditions (CC) and an associated ZIDD and/or MZD. The numerical values of the effluent discharge limits for a particular constituent are determined using the following equations. The 7Q10 low-flow condition of the receiving stream is used in place of QU when calculating these criteria.

Acute Aquatic Life Criteria

The acute aquatic life criterion (CA) is applied at either the edge of the ZID or at the end of the discharge pipe. When a ZID is granted, the mass-balance equation is written as

$$C_T = (LC_1 - C_U)(ZIDD)$$

Where LC1 is the concentration of toxic substance or mixture of toxic substances which is lethal (or immobilizing, if appropriate) to one (1) percent of the organisms tested in a toxicity test during a specified exposure period. The LC_{50} is the concentration of toxic substance or mixture of toxic substances which is lethal (or immobilizing, if appropriate) to fifty (50) percent of the organisms tested in a toxicity test during a specified exposure period. Due to the difficulty in deriving an LC_1, the equivalent value of the LC_{50}, i.e. 1/3 LC_{50}, is used instead. The equation can thus be rewritten as

$$C_T = (0.333LC_{50} - C_U)(ZIDD)$$

The acute criteria listed in Table 1 in 401 KAR 10:031, Section 4 is the LC_{50} values for those specific pollutants therefore the equation is ultimately written as

$$C_T = (C_A - C_U)(ZIDD)$$

In the case where a ZID has not been granted, the equation becomes:

$$C_T = (C_A - C_U)$$

Chronic Aquatic Life Criteria

As previously stated, the chronic criterion (CC) is applied at the end of the discharge pipe or at the edge of the assigned regulatory MZ. When an MZ is granted, the mass-balance equation for non-bioaccumulative or non-persistent chemicals is

$$C_T = (0.1LC_{50} - C_U)(MZD)$$

And for bioaccumulative or persistent chemicals is

$$C_T = (0.01LC_{50} - C_U)(MZD)$$

The chronic criteria listed in Table 1 in 401 KAR 10:031, Section 4 is the 0.1LC50 and 0.01LC50 values for those specific pollutants therefore the mass-balance equation is ultimately written as

$$C_T = (C_C - C_U)(MZD)$$

In the case where a MZ has not been granted, the equation becomes

$$C_T = (C_C - C_U)$$

Note: Unless granted prior to September 8, 2004, no new MZs shall be granted for bioaccumulative chemicals and any existing MZ shall expire no later than September 8, 2014. The following table lists those chemicals which are currently defined under 401 KAR 10:029, Section 4(1)(h)2b as bioaccumulative chemicals.

BIOACCUMULATIVE CHEMICALS OF CONCERN		
alpha-Hexachlorocyclohexane	Hexachlorobenzene	Pentachlorobenzene
beta-Hexachlorocyclohexane	Hexachlorobutadiene	Photomirex
Chlordane	Hexachlorocyclohexane	Toxaphene
DDD	Lindane	1,2,3,4-Tetrachlorobenzene
DDE	Mercury	1,2,4,6-Tetrachlorobenzene
DDT	Mirex	2,3,7,8-TCDD (Dioxin)
delta-Hexachlorocyclohexane	Octachlorostyrene	
Dieldrin	PCBs	

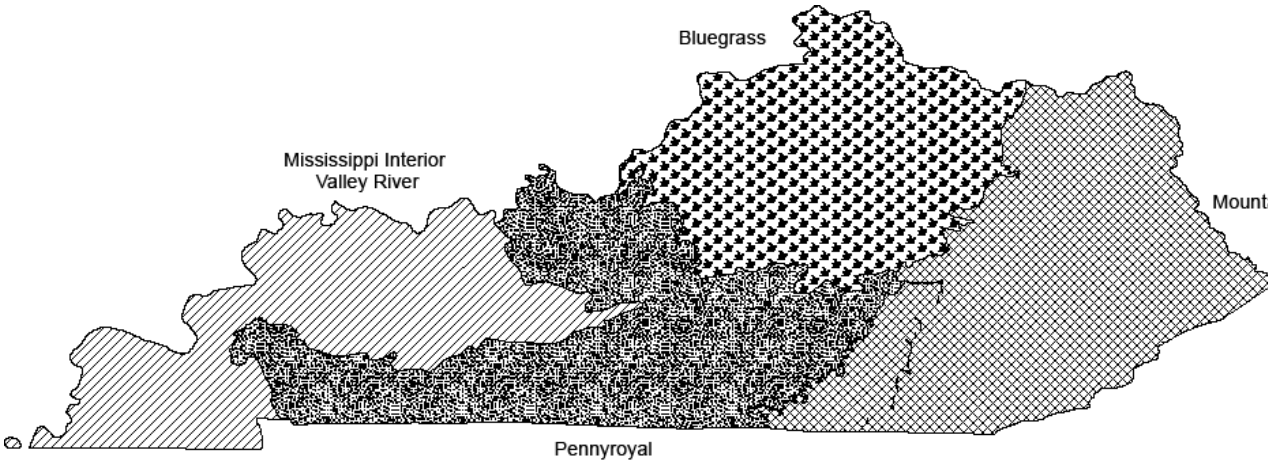
Narrative Criteria

40 CFR 131.11 requires that states must identify water bodies where toxic pollutants may be adversely affecting water quality or the attainment of such designated use, or where the level of such toxic pollutants are at a level to warrant concern and must adopt criteria for such toxic pollutants applicable to the water body sufficient to protect the designated use. In establishing narrative criteria, 40 CFR 131.11(b)(2) specifies that criteria should be based on biomonitoring methods where numerical criteria cannot be established or to supplement numerical criteria. Kentucky has developed criteria to protect aquatic life in 401 KAR 10:031, Section 4, including narrative criteria related to total dissolved solids or specific conductance, total suspended solids, settleable solids, and flow.

Aquatic community integrity may be assessed by monitoring biological indicators, including benthic macroinvertebrates (benthics), fish, and related habitats. KDOW utilizes the Kentucky MBI and KIBI developed by KDOW to assess benthic and fish communities, respectively, in conjunction with the RBP habitat field methods developed by USEPA to evaluate stream conditions for meeting the designated uses of warm and cold water aquatic life, including the narrative criteria, as cited in 401 KAR 10:026, Section 3.

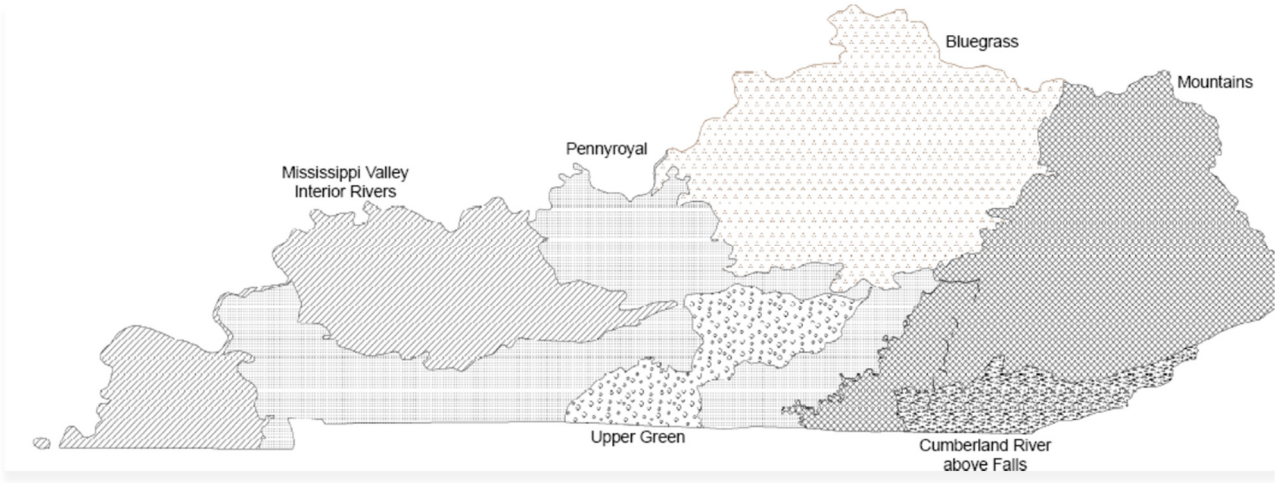
The Kentucky MBI and KIBI include metric scores based on bioregions across the state for benthics and fish, respectively. Numeric metric scores relate to five (5) narrative categories that determine whether the stream meets its designated use for aquatic life. The categories are Excellent, Good, Fair, Poor, and Very Poor. Categories Excellent and Good indicate full support of the designated use; Fair, Poor, and Very Poor indicate non-support of the designated use.

The four (4) bioregions for MBI metrics are the Bluegrass, the Mountains, the Pennyroyal, and the Mississippi Valley and Interior Rivers, as illustrated in the following figure. Associated MBI ranges for each category based on stream size are listed in the following table.



Stream Size	MBI Category	Bluegrass	Mountains	Pennyroyal	Mississippi Valley – Interior River
Headwater (< 5 mi² drainage)	Excellent	≥ 58	≥ 83	≥ 72	≥ 63
	Good	51 - 57	72 - 82	65 - 71	56 - 62
	Fair	39 - 50	48 - 71	43 - 64	35 - 55
	Poor	19 - 38	24 - 47	22 - 42	19 - 34
	Very Poor	0 - 18	0 - 23	0 - 21	0 - 18
Wadeable (≥ 5 mi² drainage)	Excellent	≥ 79	≥ 82	≥ 81	≥ 58
	Good	61 - 79	75 - 81	72 - 80	48 - 57
	Fair	41 - 60	50 - 74	49 - 71	24 - 47
	Poor	21 - 40	25 - 49	25 - 48	13 - 23
	Very Poor	0 - 20	0 - 24	0 - 24	0 - 12

The six (6) bioregions for the KIBI metrics for fish are Bluegrass, Mountains, Pennyroyal, Mississippi Valley and Interior Rivers, Cumberland River above the Falls, and the Green River Valley, as illustrated in the following figure. Associated KIBI ranges for each category are listed in the following table.



KIBI Category	Bluegrass	Mountains	Pennyroyal	Mississippi Valley – Interior River	Cumberland river above Falls	Upper Green
Excellent	$\geq$ 52	$\geq$ 71	$\geq$ 67	$\geq$ 67	$\geq$ 56	$\geq$ 86
Good	47 - 51	59 - 70	53 - 66	48 - 66	47 - 55	76 - 85
Fair	31 - 46	39 - 58	35 - 52	32 - 47	31 - 46	51 - 75
Poor	16 - 30	19 - 38	17 - 34	16 - 31	16 - 30	26 - 50
Very Poor	0 - 15	0 - 18	0 - 16	0 - 15	0 - 15	0 - 25

Human Health Criteria

For the purposes of protecting human health there are two criteria that must be satisfied, one for fish consumption (CHHFC) and one for domestic water supply (CHHDWS). Either the 7Q10 low-flow condition or harmonic mean stream flow of the receiving water or the source water of the nearest downstream public water supply is used in place of QU when calculating effluent limits based on these criteria, as stated below.

Fish Consumption Criteria

Like CC, CHHFC is applied at the edge of the assigned regulatory MZ. However, the harmonic mean flow of the receiving water is used when calculating effluent limits based on these criteria. When an MZ is granted, the mass-balance equation is written as

$$C_T = (C_{HHFC} - C_U)(MZD)$$

In the case where an MZ has not been granted, the equation becomes

$$C_T = (C_{HHFC} - C_U)$$

Domestic Water Supply Criteria

The domestic water supply criteria (CHHDWS) may apply to a pollutant that is categorized as a carcinogen or a non-carcinogen, based on a one-in-a-million or 10^6 cancer risk-protection level. CHHDWS is applied at the point of withdrawal of the nearest downstream public water supply intake using appropriate flow regime of the source water for the public water supply, i.e. the harmonic mean stream flow for carcinogens and the 7Q10 low-flow condition for non-carcinogens. Table B found in 401 KAR 10:026, Section 5(2)(b) lists the surface water intakes for domestic water supply use. Because of this application point, CHHDWS is calculated assuming a complete mix. The mass-balance equation is written for a carcinogen as

$$C_T = \frac{[(C_{HHDWS})(Q_T + Q_{SWHM}) - (C_U)(Q_{SWHM})]}{Q_T}$$

And for a non-carcinogen as

$$C_T = \frac{[(C_{HHDWS})(Q_T + Q_{SW7Q10}) - (C_U)(Q_{SW7Q10})]}{Q_T}$$

Waste Load Allocation Models

DOW uses the models QUAL2E/K, CORMIX and SSTWAM models to assist in the development the WLA. The QUAL2K model develops effluent limitations for biochemically degradable wastewaters from residential types of effluents. CORMIX is a mixing zone analysis model used to determine the size and effect of a mixing zone. SSTWAM is a WLA model that generates effluent limits for toxic pollutants which have water quality criteria. These models are detailed below.

CORMIX

CORMIX is an EPA-supported simulation and decision support system developed by MixZon for environmental impact assessment of mixing zones resulting from continuous point-source discharges. The system emphasizes the role of boundary interaction to predict mixing behavior and plume geometry.

The CORMIX methodology contains systems to model and design single-port, multiport diffuser discharges and surface discharge sources. Effluents considered may be conservative, non-conservative, heated, dense brine discharges or contain suspended sediments. Advanced information systems provide documented water quality modeling, NPDES regulatory decision support, visualization of regulatory mixing zones, and tools for outfall specification.

DOW primarily utilizes this model to determine plume geometry, i.e., allowable MZ and ZID, for multi-port high-rate submerged diffusers with conservative discharges.

River and Stream Water Quality Model

The River and Stream Water Quality Model (QUAL2E/K) is a non-uniform, steady-state mass-balance model that assumes mixing vertically and laterally. The model has the ability to accept many combinations of point or nonpoint sources or withdrawals.

QUAL2K was developed by EPA to modernize QUAL2E, developed by Brown and Barnwell in 1987.

DOW primarily uses the model to develop effluent limitations for biochemically-degradable wastewaters, including BOD, pH, and DO.

Steady-State Toxics Wasteload Allocation Model

The Steady-State Toxics Wasteload Allocation Model (SSTWAM) models is a uniform, steady-state mass-balance model that models water quality using the formulas developed above.

SSTWAM was originally developed by DOW in the 1990s as a steady-state mass-balance workbook in Microsoft Excel.

Whole Effluent Toxicity Criteria

In addition to chemical-specific criteria, 401 KAR 10:031 contains whole effluent toxicity (WET) criteria that necessitate the evaluation of complete effluents. Like the chemical-specific aquatic life criteria, the WET criterion is divided into two categories – acute and chronic. However, WET criteria are not measured in pollutant concentrations but rather in toxicity units (TUs). Toxicity units are defined mathematically as 100 defined by a specific toxic effect. Acute toxicity is expressed in units of TU_A and is defined as $100/LC_{50}$ (in percent). Chronic toxicity is expressed as TU_C and is defined as $100/IC_{25}$. The

IC25 is concentration at which a twenty-five (25) percent reduction is shown in reproduction or growth in test organisms.

Additionally, a relationship between TU_A and TU_C must be defined. This relationship is known as the acute to chronic ratio and is defined as the ratio of acute toxicity, expressed as an LC_{50}, of an effluent to its chronic toxicity. It is used as a factor to estimate chronic toxicity from acute toxicity data. DOW has defined two factors, one for bioaccumulative or persistent and one for non-accumulative or non-persistent effluents. For bioaccumulative or persistent constituents,

$TU_C = 0.01\ TU_A$

For non-bioaccumulative or non-persistent constituents,

$TU_C = 0.1\ TU_A$

Acute Whole Effluent Criteria

Like C_A, C_{AWET} is applied at either the edge of the ZID or at the end of the discharge pipe. Pursuant to 401 KAR 10:029, Section 4(2) and 401 KAR 10:031, Section 4(1)(j), acute toxicity shall not exist within an assigned mixing zone or in the discharge itself unless a ZID has been assigned. Or, more simply stated, C_{AWET} shall not exceed $1.00TU_A$ unless a ZID has been assigned, in which case C_{AWET} shall not exceed $0.3\ TU_A$. The mass-balance equation is written with no ZID as

$$C_T = C_{AWET} = 1.00TU_A$$

And with a ZID assigned as

$$C_T = (0.3C_{AWET} - C_U)(ZIDD)$$

Or

$$C_T = (0.3TU_A - C_U)(ZIDD)$$

Chronic Whole Effluent Criteria

Pursuant to 401 KAR 10:031, Section 4(j), the allowable instream concentration of toxic substances or whole effluents containing toxic substances shall not exceed a TUC of 1.00, utilizing the IC25. Like C_C, C_{CWET} is applied at the edge of the assigned regulatory MZ. When an MZ is granted the mass-balance equation is written as

$$C_T = (C_{CWET} - C_U)(MZD)$$

The equation can be rewritten substituting $1.00\ TU_C$ for C_{CWET} as

$$C_T = (1.00TU_C - C_U)(MZD)$$

In order to compare C_{CWET} to C_{AWET}, the equation can be rewritten substituting the acute-to-chronic ratio and C_{AWET} for C^{CWET} for a non-bioaccumulative or non-persistent pollutant as

$$C_T = (0.1C_{AWET} - C_U)(MZD)$$

And for a bioaccumulative or persistent pollutant as

$$C_T = (0.01C_{AWET} - C_U)(MZD)$$

In the case where an MZ has not been granted the equation becomes

$$C_T = (C_{CWET} - C_U)$$

If no background data is available for the specific pollutant then C_U is assumed to be zero (0) and C_{CWET} is applied as an end-of-pipe effluent limit.

Exception to Criteria for Individual Dischargers

Kentucky WQS at 401 KAR 10:031, Section 11 enables DOW to grant an exception to criteria through the KPDES permit to an individual discharger based on a demonstration that KPDES permit compliance with existing instream criteria cannot be attained because of one or more of the following conditions:

(1) naturally occurring pollutant concentrations prevent attainment;
(2) natural, ephemeral, intermittent, or low flow conditions or water levels prevent attainment;
(3) non remediable human induced conditions or sources of pollution prevent attainment;
(4) hydrologic modifications preclude the attainment of the use;
(5) non-water quality related natural physical features of the surface water preclude attainment; or
(6) Controls more stringent than those required by Sections 301(b) and 306 of the Clean Water Act, 33 U.S.C. 1311(b) and 1316, would result in substantial and widespread economic and social impact as determined by the guidelines in Interim Economic Guidance for Water Quality Standards Workbook, EPA, March 1995.

SECTION 3

ANTIDEGRADATION

3. ANTIDEGRADATION

The CWA requires each State to develop an Antidegradation Policy and associated implementation procedures for the protection and maintenance of a waterbody's existing water quality. Kentucky's Antidegradation Policy is found in 401 KAR 10:029, Section 1. The antidegradation policy implementation methodology is contained in 401 KAR 10:030.

3.1. Antidegradation Policy

The purpose of 401 KAR 10:026 through 401 KAR 10:031 is to safeguard the surface waters of the commonwealth for their designated uses, to prevent the creation of new pollution of these waters, and to abate existing pollution.

Where the quality of surface waters exceeds that necessary to support propagation of fish, shellfish, wildlife and recreation in and on the water, that quality shall be maintained and protected unless the Cabinet finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the Cabinet's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located.

For point source discharges, water quality shall be maintained and protected in these waters according to the procedures specified in 401 KAR 10:030, Section 1(2)(b) or (3)(b).

In allowing degradation or lower water quality, the Cabinet shall assure water quality adequate to protect existing uses fully.

The Cabinet shall assure that there shall be achieved the highest statutory and regulatory requirements for waste treatment by all new and existing point sources and that nonpoint sources of pollutants be controlled by application of all cost effective and reasonable best management practices.

Water quality shall be maintained and protected in a water categorized as an outstanding national resource water according to the procedures specified in 401 KAR 10:030, Section 1(1)(b).

Water quality shall be maintained and protected in those waters designated as outstanding state resource waters according to the procedures specified in 401 KAR 10:031, Section 8.

If potential water quality impairment associated with a thermal discharge is involved, a successful demonstration conducted under Section 316 of the Clean Water Act, 33 U.S.C. 1326, shall be in compliance with this policy.

3.1.1. Implementation Methodology

All surface waters of the commonwealth have been assigned to an antidegradation category based on specific criteria. These categories are: Outstanding National Resource Water (ONRW), Exceptional Water (EW), Impaired Water (IW) and High Quality Water (HQ).

3.1.2. Outstanding National Resource Water

An ONRW is surface water that at minimum meets the requirements to be designated an Outstanding State Resource Water (OSRW) pursuant to 401 KAR 10:031, Section 8 and demonstrates national ecological or recreational significance. Kentucky has eight (8) such categorized as ONRWs. A list of these waters can be found in 401 KAR 10:030, Section 1(1) Table 1. The implementation methodology for this category of waters is as follows:

(1) The water quality shall be maintained and protected;
(2) New or expanded discharges that result in permanent or long-term changes in water quality are prohibited; and
(3) Temporary or short term changes in water quality may be approved if the changes do not have a demonstrable impact on the ability of the water to support its designated uses.

Exceptional Water

The Cabinet has categorized over 250 surface waters as an EW. To be categorized as an EW, a surface water must meet one or more of the following criteria:

(1) Designated as a Kentucky Wild River and is not categorized as an ONRW;
(2) Designated as an OSRW as established in 401 KAR 10:031, Section 8(1)(a)1, 2, and 3 and Section 8(1)(b);
(3) Contain a fish community that is rated "excellent" by the use of the Index of Biotic Integrity included in Development and Application of the Kentucky Index of Biotic Integrity (KIBI), 2003;
(4) Contain a macroinvertebrate community that is rated "excellent" by the Macroinvertebrate Bioassessment Index included in "The Kentucky Macroinvertebrate Bioassessment Index," 2003; or
(5) Included in the Cabinet's reference reach network.

The implementation methodology for new or expanded discharges to an EW is the same as the implementation methodology for an HQ except when the EW carries a stream use designation of OSRW due to its support of a federally listed threatened or endangered species.

Impaired Water

Surface waters that have been identified pursuant to 33 U.S.C. 1315(b) are categorized as impaired waters. Impaired waters are those waters which have been assessed by the Cabinet as not fully supporting any applicable designated use unless it is designated as an OSRW or the impairment is for fish consumption due to mercury contamination. Surface waters categorized as impaired are listed in DOW's biannual Integrated Report to Congress on the Condition of Water Resources in Kentucky. The implementation methodology for new or expanded discharges to this category of waters is as follows:

(1) All existing uses shall be protected and the level of water quality necessary to protect those existing uses shall be assured in impaired water; and

(2) The process to allow a discharge into an impaired water and to assure protection of the water shall be regulated by the requirements in the Kentucky Pollution Discharge Elimination System Program, 401 KAR 5:050-5:080.

High Quality Water

The largest of all of the antidegradation categories is the High Quality Water (HQ) group. It consists of all surface waters that have not been categorized as an ONRW, EW or IW; it is therefore the default category for any surface water that has not been assessed by the Cabinet. The implementation methodology for new or expanded discharges to HQs consists of the following requirements:

(1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected;

(2) An application for a KPDES permit for a new or expanded discharge shall contain information demonstrating that the lowering of water quality is necessary to accommodate important economic or social development in the area in which the water is located, utilizing Form SDAA;

(3) A permit applicant who has failed to demonstrate the necessity and social or economic development importance for lowering water quality shall not receive a permit unless (a) The applicant submits a revised SDAA that demonstrates the necessity for lowering water quality, or (b) The applicant demonstrates that the discharge shall not consume more than ten (10) percent of the available assimilative capacity of the receiving stream outside of a designated mixing zone or zone of initial dilution for each new or increased pollutant in the discharge;

(4) A permit applicant who demonstrates the necessity and social or economic development importance for lowering water quality shall meet the requirements of the KPDES program, 401 KAR 5:050 through 5:080; and

(5) The Cabinet's determination shall be documented in the permit Fact Sheet and included in the administrative record for the permit or action.

Socioeconomic Demonstration and Alternates Analysis

Socioeconomic Demonstration

The socioeconomic demonstration portion of this requirement shall consider the following factors:

(1) The boundaries of the affected community;

(2) The potential effect on employment, including a comparison of local unemployment rates and state and national unemployment rates;

(3) The potential effect on median household income levels, including a comparison of the present median household income level, projected median household income level, and number of households affected in the defined community;

(4)) The potential effect on tax revenues, including current tax revenues in the affected community compared to projected increase in tax revenues generated by the permitted project;

(5) The potential effect of the facility on the environment and public health; and

(6) Other potential economic or social effect to the community that the applicant includes in the application.

Alternatives Analysis

The alternatives analysis shall consider the following factors:

(1) Pollution prevention measures, such as changes in plant processes, source reductions, or substitution with less toxic substances;
(2) The use of best management practices to minimize impacts;
(3) Recycle or reuse of wastewater, waste by-products, or production materials and fluids;
(4) Application of water conservation methods;
(5) Alternative or enhanced treatment technology;
(6) Improved operation and maintenance of existing treatment systems;
(7) Seasonal or controlled discharge options;
(8) Land application or infiltration to capture pollutants and reduce surface runoff, on-site treatment, or alternative discharge locations; and
(9) Discharge to other treatment facilities.

Activities Not Subject to Antidegradation Implementation

The following activities are not subject to the EW or HQ antidegradation implementation procedures:

(1) The renewal of a KPDES permit that does not authorize pollutant loading to the receiving stream in excess of that previously authorized;

(2) An increase in pollutant loading within the limits previously approved by the KPDES permit; or

(3) A new or expanded discharge that the applicant demonstrates shall not consume more than ten (10) percent of the available assimilative capacity of the receiving stream outside of a designated mixing zone or zone of initial dilution for each new or increased pollutant in the discharge.

Activities That Constitute Compliance with Antidegradation Implementation

The following activities constitute compliance with the antidegradation implementation procedures:

(1) The approval of a POTW's regional facility plan pursuant to 401 KAR 5:006 shall constitute compliance with the alternatives analysis and socioeconomic demonstration for a regional facility;

(2) A new or expanded discharge associated with a project identified in the Kentucky Transortation Cabinet's six (6) year road plan; or

(3) An individual MS4 permit issued pursuant to 401 KAR 5:050 through 5:080.

SECTION 4

EFFLUENT LIMITATIONS

4. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Having completed an evaluation of the applicable technology-based effluent requirements and applicable water quality based effluent requirements, the permit writer determines (1) the pollutants that are to be controlled by chemical-specific numeric effluent limits, (2) WET requirements if appropriate, (3) the type and frequency of self monitoring, and (4) for permit renewals if anti-backsliding applies. .

4.1. Chemical-Specific Numeric Effluent Limitations

The imposition of chemical-specific numeric effluent limitations is necessary when reasonable potential has been demonstrated. Pursuant to 401 KAR 5:065, Section 2(4) [40 CFR 122.44] the permit must contain effluent limitations that satisfy both technology and water quality-based concerns. To comply with this requirement a comparison of the calculated technology-based effluent limitations to the calculated water quality-based effluent limitations is required. When performing such a comparison there must be consistency in the units and the chemical species. Direct comparisons of different speciations of a pollutant are irrelevant and produce illogical results; therefore e.g. calculated technology-based effluent requirements for total chromium must be compared to the calculated water quality-based effluents for total chromium not trivalent chromium.

In general technology-based effluent limitations are expressed in terms of mass, i.e. lbs/day, whereas most water quality-based effluent limitations are expressed in terms of concentration, i.e. mg/l. The permit writer must convert from lbs/day to mg/l or mg/l to lbs/day using the following formulas in order to perform a comparison of the calculated effluent limitations:

$$\text{Load} = \text{Flow} \times \text{Concentration} \times 8.34, \text{ or}$$

$$\text{Concentration} = \frac{\text{Load}}{\text{Flow} \times 8.34}$$

8.34 is a conversion factor with units of l·lbs/MG·mg

Where load is expressed in lbs/day, flow is expressed in MGD, and concentration is expressed in mg/l.

The final effluent limits for a selected pollutant of concern shall be expressed in appropriate units, i.e. mass, concentration or a combination of the two. 401 KAR 5:065, Section 2(4) [40 CFR 122.44 (f)] requires all pollutants limited in permits to be expressed in terms of mass except for pollutants which cannot appropriately be expressed by mass or the applicable requirements are more appropriately expressed in terms of concentrations. Pollutants limited in terms of mass additionally may be limited in terms of other units of measurement, and the permit shall require the permittee to comply with both limitations.

4.2. WET Effluent Limitations

When WET requirements are imposed in the permit a toxicity limit expressed in units of TU_A for acute or TU_C for chronic concerns is included on the effluent page with the chemical specific requirements. Additional WET language regarding the type of toxicity test required, test protocols and the percent effluent at which the permittee must demonstrate compliance. Percent effluent is determined by taking the reciprocal of the toxicity limit and multiplying by 100. For example if the WET limit is 3.00 TU_C, the permittee must demonstrate that chronic toxicity does not exist in a mixture of 33% effluent and 67% synthetic water.

4.3. Monitoring and Reporting Requirements

All permits are required by 401 KAR 5:070, Section 3 [40 CFR 122.48] and 401 KAR 5:065, Section 2(4) [40 CFR 122.44(i)] to include monitoring and reporting requirements designed to measure compliance with permit conditions.

Monitoring Requirements

The permit must include monitoring requirements for each pollutant limited in the permit and the volume of effluent discharged from each outfall. When establishing monitoring requirements, the permit writer must determine the type, intervals, and frequency of monitoring. The monitoring program is required to be sufficient to yield data that is representative of the monitored activity. In regards to the type of monitoring required, the permit writer must decide if effluent monitoring alone is sufficient or if other monitoring is required. Examples of other types of monitoring and when they are required include:

(1) Influent monitoring when permit conditions are written in the form of a pollutant reduction;

(2) Source water monitoring when permit limits are expressed in the form of net limits;

(3) Internal monitoring when it is infeasible or impractical to monitor at the outfall, i.e. when outfall may be flooded or when it is necessary to demonstrate compliance with a technology-based effluent limit when wastestreams are combined for treatment and discharge; and

(4) Ambient monitoring when permit contains conditions that are measured by changes in receiving water conditions, i.e. hydrographically controlled releases, etc.

In determining the frequency of monitoring, the permit writer considers: size and design of the facility, type of treatment, location of discharge, frequency of discharge (batch, continuous), compliance history, nature of pollutants, number of monthly samples used in developing permit limit, and cost. The frequency of sampling must be of sufficient regularity to provide adequate data to evaluate compliance with the permit limits.

In addition to frequency, the permit writer must specify sample collection requirements. In determining the appropriate sample type, the permit writer considers pollutant characteristics, analytical method requirements, frequency of discharge (batch, continuous), etc. Types of samples most often required are: grab, composite, continuous, and instantaneous.

Grab samples are taken on a one-time basis without consideration of flow rate and time. This sample type is typically used for monitoring batch discharges. Grab samples are required for pollutants that are affected by changes in ambient conditions. Composite samples are made up of two or more discrete aliquots collected over a period of time. They provide a more representative measure of the discharge of pollutants over a given period of time and account for variability in pollutant concentration and discharge rate. Composite samples are defined by the time interval between aliquots and volume of each aliquot and are typically used for pollutants with varying concentration over the period of discharge, i.e. BOD, TSS, chronic toxicity, etc. Continuous and instantaneous samples are used primarily for flow measurements.

Analytical Methods Requirements

Pursuant to 401 KAR 5:065, Section 2(4) [40 CFR 122.44(i)(1)(iv)], pollutant analysis shall be according to test procedures approved under 401 KAR 5:065, Section 2(8) [40 CFR 136] or other methods approved under 401 KAR 5:065, Section 2(9)-(10) [40 CFR subchapters N or O]. 401 KAR 5:065, Section 2(9) [Subchapter N] establishes the ELGs and 401 KAR 5:065, Section 2(10) [Subchapter O] establishes requirements for sewage sludge. When two or more approved analytical methods are available for a pollutant of concern, the method selected must be sufficiently sensitive to demonstrate compliance with the assigned effluent limitation. DOW includes a general statement requiring the permittee to utilize such methods. However, in cases where DOW has determined that a specific analytical method or method detection level (MDL) is required, language is included in the permit requiring that analytical method or MDL, e.g. EPA Method 200.8 for metals, and EPA Method 1631E for mercury.

Reporting Requirements

All permits must contain reporting requirements based upon the impact of the regulated activity. At a minimum, monitoring reports must be submitted annually. In accordance with 401 KAR 5:065, Section 2(4) [40 CFR 122.41(l)(4)], DOW requires analytical results to be reported on Discharge Monitoring

Report (DMRs) form and submitted on a schedule commensurate with the frequency of monitoring, e.g. monthly monitoring equals monthly submission, etc.

4.4. Anti-backsliding Provision

Pursuant to 401 KAR 5:065, Section 2(4) [40 CFR 122.44(l)], when a permit is renewed or reissued, interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit.

In the case of effluent limitations established on the basis of ELG, a permit may not be renewed, reissued, or modified on the basis of effluent guidelines promulgated subsequent to the original issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit.

Exceptions to the anti-backsliding provision include:

(1) Material and substantial alterations or additions to the permitted facility occurred after permit issuance which justify the application of a less stringent effluent limitation;

(2) Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance;

(3) Technical mistakes or mistaken interpretations of law were made in issuing the permit under Section 402(a)(1)(b) of the CWA;

(4) A less stringent effluent limitation is necessary because of events over which the permittee has no control and for which there is no reasonably available remedy;

(5) The permittee has received a permit modification under section 301(c), 301(g), 301(h), 301(i), 301(k), 301(n), or 316(a); or

(6) The permittee has installed the treatment facilities required to meet the effluent limitations in the previous permit and has properly operated and maintained the facilities but has nevertheless been unable to achieve the previous effluent limitations, in which case the limitations in the reviewed, reissued, or modified permit may reflect the level of pollutant control actually achieved (but shall not be less stringent than required by effluent guidelines in effect at the time of permit renewal, reissuance, or modification).

In no event may a permit be renewed, reissued, or modified to contain an effluent limitation which is less stringent than required by effluent guidelines in effect at the time the permit is renewed, reissued, or modified. In no event may a permit to discharge into waters be renewed, issued, or modified to contain a less stringent effluent limitation if the implementation of such limitation would result in a violation of a water quality standard under Section 303 applicable to such waters

SECTION 5

STANDARD CONDITIONS

5. STANDARD CONDITIONS

All permits issued by DOW include language specific to 401 KAR 5:065, Section 2(1) [40 CFR 122.41], schedules of compliance, and reopener clauses.

Conditions Applicable to All Permits

All permits shall either expressly or by reference include the conditions established by 401 KAR 5:065, Section 2(1) [40 CFR 122.41]. These standard conditions or "boiler plate language" address (1) duty to comply with all conditions of the permit, (2) duty to reapply, (3) need to halt or reduce activity not a defense, (4) duty to mitigate, (5) proper operation and maintenance of treatment facilities and systems, (6) permit actions, (7) property rights, (8) duty to provide information, (9) inspection And Entry, (10) Monitoring And Records, (11) Signatory Requirements, (12) Reporting Requirements, (13) Bypasses, And (14) Upsets.

Schedules of Compliance

All permits contain a general compliance schedule requiring the permittee to be in compliance with all conditions of the permit upon the effective date of the permit. 401 KAR 5:070, Section 2 [40 CFR 122.47] authorizes specific schedules of compliance for the first issuance of a permit to a new source or new discharger when necessary to allow a reasonable opportunity to attain compliance with requirements issued or revised after commencement of construction and for water quality based effluent limitations for water quality standards adopted after July 1, 1977. Such schedules of compliance must include a final date for achieving compliance and interim compliance and reporting dates if the final compliance date is more than one year from the effective date of the permit.

Reopener Clause

In accordance with 401 KAR 5:070, Section 6(1) [40 CFR 122.62(a)(7)], a permit may be reopened for modification or revoked and reissued when required by the reopener conditions of 401 KAR 5:065, Section 2(4) [40 CFR 122.44(b)]. A permit shall be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved in accordance with 401 KAR 5:050 through 5:080, if the effluent standard or limitation so issued or approved:

(1) Contains different conditions or is otherwise more stringent than any effluent limitation in the permit;

(2) Controls any pollutant not limited in the permit; or

6. DEFINITIONS, ABBREVIATIONS, AND ACRONYMS

30-day average – means the arithmetic mean of pollutant parameter values for samples collected in a period of 30 consecutive days.

401(a) Certification - A requirement of CWA section 401(a) that all federally issued permits be certified by the state in which the discharge occurs. The state certifies that the proposed permit will comply with state water quality standards and other state requirements.

7-day average – means the arithmetic mean of pollutant parameter values for samples collected in a period of 7 consecutive days.

Acute criteria - The highest instream concentration of a toxic substance or an effluent to which an organism can be exposed for one (1) hour, without causing an unacceptable harmful effect.

Acute effect - The effect of a stimulus severe enough to rapidly induce an effect; in aquatic toxicity tests, an effect generally observed in 96 hours or less is typically considered acute. When referring to aquatic toxicology or human health, an acute effect is not always measured in terms of lethality.

Acute toxicity - Lethality or other harmful effect sustained by either an indigenous aquatic organism or a representative indicator organism used in a toxicity test, due to a short-term exposure, of ninety-six (96) hours or less, to a specific toxic substance or mixture of toxic substances.

Acute toxicity unit - The reciprocal of the effluent dilution that causes the acute effect, or LC_{50}, by the end of the acute exposure period.

Acute-chronic ratio - The ratio of the acute toxicity, expressed as an LC50, of an effluent or a toxic substance, to its chronic toxicity. It is used as a factor to estimate chronic toxicity from acute toxicity data.

Administrator - means the Administrator of the United States Environmental Protection Agency, or an authorized representative

Adversely affect or adversely change - Means to alter or change the community structure or function, to reduce the number or proportion of sensitive species, or to increase the number or proportion of pollution tolerant aquatic species so that aquatic life use support or aquatic habitat is impaired.

Annual Sewer User Survey – Annual survey conducted by a POTW to determine if conditions warrant the development and implementation of a pretreatment program.

Anti-backsliding - In general, a statutory provision that prohibits the renewal, reissuance, or modification of an existing NPDES permit that contains effluent limitations, permit conditions, or standards that are less stringent than those established in the previous permit.

Antidegradation - A policy developed and adopted as part of a state's water quality standards that ensures protection of existing uses and maintains the existing level of water quality where that water quality exceeds levels necessary to protect fish and wildlife propagation and recreation on and in the water. This policy also includes special protection of water designated as Outstanding National Resource Waters.

Applicable standards and limitations - means all standards and limitations to which a discharge or a related activity is subject pursuant to KRS Chapter 224 and 401 KAR Chapters 4 through 11, including effluent limitations, water quality standards, standards of performance, or toxic effluent standards.

Application - means the document submitted by an applicant to the cabinet that provides information used by the cabinet in the issuance of a permit or approval.

Approval Authority - means the Director in an NPDES State with an approved State pretreatment program and the appropriate Regional Administrator in a non-NPDES State or NPDES State without an approved State pretreatment program.

Approved POTW Pretreatment Program – means a program administered by a POTW that means the requirements of 401 KAR 5:057, Sections 6 and 7.

Average monthly discharge limitation - The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during that month divided by the number of daily discharges measured during that month.

Balanced indigenous community - means a biotic community typically characterized by diversity, the capacity to sustain itself through cyclic seasonal changes, presence of necessary food chain species, and a lack of domination by pollution tolerant species. The community may include historically nonnative species introduced in connection with a program of wildlife management and species whose presence or abundance results from substantial, irreversible environmental modification. Normally such a community does not include species whose presence or abundance is attributable to the introduction of pollutants that will be eliminated by compliance of all sources with 401 KAR 5:065, and may not include species whose presence or abundance is attributable to alternative effluent limitations imposed pursuant to 401 KAR 5:055.

Best Available Technology Economically Achievable (BAT) - Technology standard established by the CWA as the most appropriate means available on a national basis for controlling the direct discharge of toxic and nonconventional pollutants to navigable waters. BAT limitations in effluent guidelines, in general, represent the best existing performance of treatment technologies that are economically achievable within an industrial point source category or subcategory.

Best Conventional Pollutant Control Technology (BCT) - Technology-based standard for the discharge from existing industrial point sources of conventional pollutants including BOD, TSS, fecal coliform, pH, oil and grease. The BCT is established in light of a two-part cost reasonableness test, which compares the cost for an industry to reduce its pollutant discharge with the cost to a POTW for similar levels of reduction of a pollutant loading. The second test examines the cost- effectiveness of additional industrial treatment beyond BPT. EPA must find limits which are reasonable under both tests before establishing them as BCT.

Best Management Practice (BMP) - means: (a) For agriculture operations, as defined by KRS 224.71-100(3); or (b) For all other purposes: 1. Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the commonwealth; and 2. Treatment requirements, operating procedures, practices to control site run-off, pollution of surface water and groundwater from nonpoint sources, spillage or leaks, sludge or waste disposal, or drainage from raw material storage(e)

Best Practicable Control Technology Currently Available (BPT) - The first level of technology standards established by the CWA to control pollutants discharged to waters of the U.S. BPT limitations in effluent guidelines are generally based on the average of the best existing performance by plants within an industrial category or subcategory.

Best Practicable Waste Treatment Technology (BPWTT) - generally means the cost effective technology that can treat wastewater, combined sewer overflows, and non-excessive infiltration and inflow in POTWs to meet Secondary Treatment Standards, Water Quality Standards or more stringent state standards. 401 KAR 5:080, Section 2(3) [40 CFR 125.3(a)(1)] requires permits for POTWs to include BPWTT requirements no later than July 1, 1983. The determination of BPWTT is pollutant specific.

Best Professional Judgment (BPJ) - The method used by permit writers to develop technology-based NPDES permit conditions on a case-by-case basis using all reasonably available and relevant data.

Bioassay - A test used to evaluate the relative potency of a chemical or a mixture of chemicals by comparing its effect on a living organism with the effect of a standard preparation on the same type of organism.

Biochemical Oxygen Demand (BOD) - A measurement of the amount of oxygen used by the decomposition of organic material, over a specified time (usually 5 days) in a wastewater sample; it is used as a measurement of the readily decomposable organic content of a wastewater.

Bypass - means the intentional diversion of sewage or waste-streams from a portion of a facility or industrial user's treatment facility.

Calendar day - means for the purpose of this permit, any 24-hour period.

Capacity, Management, Operation, and Maintenance (CMOM) Program – See EPA Guidance Document No. EPA 305-B-05-002.

Carbonaceous Biochemical Oxygen Demand (CBOD) – means the biochemical oxygen demand of carbonaceous sources. This differs from BOD in that BOD measures both nitrogenous and carbonaceous sources, whereas CBOD excludes nitrogenous sources (e.g., nitrifying bacteria) from determination through the addition of a nitrification inhibitor.

Certified operator - means an individual who holds an active certified operator's certificate issued in accordance with 401 KAR 11:050.

Chronic criteria - means the highest instream concentration of a toxic substance or an effluent to which organisms are able to be exposed for ninety-six (96) hours without causing an unacceptable harmful effect.

Chronic effect - The effect of a stimulus that lingers or continues for a relatively long period, often one-tenth of the life span or more. The measurement of a chronic effect can be reduced growth, reduced reproduction, and such, in addition to lethality.

Chronic toxicity - means lethality, reduced growth or reproduction or other harmful effect sustained by either indigenous aquatic organisms or representative indicator organisms used in toxicity tests due to long-term exposures, relative to the life span of the organisms or a significant portion of their life span, due to toxic substances or mixtures of toxic substances.

Chronic Toxicity Unit (TU_C) - means the reciprocal of the effluent dilution that causes twenty-five (25) percent inhibition of growth or reproduction to the test organisms by the end of the chronic exposure period.

Clean Water Act (CWA) - The Clean Water Act is a statute passed by the U.S. Congress to control water pollution. It was formerly referred to as the Federal Water Pollution Control Act of 1972 or Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500), 33 U.S.C. 1251 et seq., as amended by: Public Law 96-483; Public Law 97-117; Public Laws 95-217, 97-117, 97-440, and 100-04.

Code of Federal Regulations (CFR) - A codification of the final rules published daily in the Federal Register. Title 40 of the CFR contains regulations for the protection of the environment.

Cold Water Aquatic Habitat (CAH) - means surface waters and associated substrate that are able to support indigenous aquatic life or self-sustaining or reproducing trout populations on a year-round basis.

Combined Sewers – means a sewer or sewer line designed to carry storm water runoff as well as sanitary wastewater.

Combined Sewer Overflow – means the flow from a combined sewer in excess of the interceptor or regulator capacity that is discharged into a receiving water without going to a POTW.

Compliance Schedule (or Schedule of Compliance) - A schedule of remedial measures included in a permit, including an enforceable sequence of interim requirements (for example, actions, operations, or milestone events) leading to compliance with the CWA and regulations.

Composite Sample - Sample composed of two or more discrete aliquots (samples). The aggregate sample will reflect the average water quality of the compositing or sample period.

Continuous facility discharge - means a discharge that occurs without interruption throughout the operating hours of the facility, except for infrequent shutdowns for maintenance, process changes, or other similar activities.

Control Authority - refers to: (1) the POTW if the POTW's Pretreatment Program Submission has been approved in accordance with the requirements of 401 KAR 5:057, Section 8; or (2) the Approval Authority if the submission has not been approved.

Conventional pollutant –DOW defines as: biochemical oxygen demand (BOD), chemical oxygen demand (COD), total organic carbon (TOC), total suspended solids (TSS), ammonia (as N), bromide, chlorine (total residual), color, fecal coliform, fluoride, nitrate, Kjeldahl nitrogen, oil and grease, E. coli, or phosphorus. EPA defines as: BOD, TSS, fecal coliform bacteria, oil and grease, and pH

Criteria - means specific concentrations or ranges of values, or narrative statements of water constituents that represent a quality of water expected to result in an aquatic ecosystem protective of designated uses of surface waters. Criteria are derived to protect legitimate uses such as aquatic life, domestic water supply, and recreation and to protect human health.

Daily maximum concentration - means the daily determination of concentration as an instantaneous maximum that cannot be exceeded by any sample.

Daily precipitation log - means a daily record of precipitation levels maintained by the permittee to provide proof that a qualifying event has occurred within the preceding 24 hours. This may take the form of daily readings of local rain gages, National Oceanic and Atmospheric Administration data, etc.

Day - means a twenty-four (24) hour period.

Designated Uses - Those uses specified in water quality standards for each waterbody or segment whether they are being attained

Development Document - A report prepared during development of an effluent guideline by EPA; that provides the data and methodology used to develop effluent guidelines and categorical pretreatment standards for an industrial category.

Direct discharge - means the discharge of a pollutant into waters of the commonwealth if the discharge is not included under the definition of indirect discharger and does not include a discharge of animal waste onto land by land application if the discharge does not reach the waters of the commonwealth.

Disappearing stream - means an intermittent or perennial surface stream that terminates and drains underground through caves, fractures, or swallets in the stream bed.

Discharge monitoring report (DMR) - The state approved form, including any subsequent additions, revisions, or modifications for the reporting of self- monitoring results by permittees.

Discharge or discharge of a pollutant - means the addition of a pollutant or combination of pollutants to waters of the commonwealth from a point source.

Diversion - means a channel, embankment, or other manmade structure constructed for the purpose of diverting water from one area to another

Division - means the Kentucky Division of Water, within the Department for Environmental Protection, Energy and Environment Cabinet.

Domestic - means relating to household wastes or other similar wastes. It is used to distinguish municipal, household, or commercial water or wastewater services from industrial water or wastewater services.

Domestic sewage - means sewage devoid of industrial or other wastes and that is typical of waste received from residential facilities. It may include wastes from commercial developments, schools, restaurants, and other similar developments.

Domestic water supply (DWS) - means surface waters that with conventional domestic water supply treatment are suitable for human consumption through a public water system as defined in 401 KAR 8:010, culinary purposes, or for use in a food or beverage processing industry; and meet state and federal regulations under the Safe Drinking Water Act, as amended, 42 U.S.C. 300f - 300j-26.

Draft permit -means a document prepared pursuant to 401 KAR 5:075 indicating the cabinet's preliminary decision to issue or deny, modify, revoke and reissue, revoke, or reissue a permit. It includes a notice of intent to revoke a permit and a notice of intent to deny a permit as provided in 401 KAR 5:075. It does not include a proposed permit; a denial of a request for modification, revocation, and reissuance; or a denial of a request for revocation.

E. coli or "Escherichia coli" - means an aerobic and facultative anaerobic gram negative, nonspore forming, rod shaped bacterium that can grow at forty-four and five tenths (44.5) degrees Celsius, that is ortho-nitrophenyl-B-D-galactopyranoside (ONPG) positive, and Methylumbelliferyl glucuronide (MUG) positive. It is a member of the indigenous fecal flora of warm-blooded animals.

Effluent ditch - means that portion of a treatment system that is a discrete, person-made conveyance, either totally owned, leased or under valid easement by the discharger that transports a discharge to surface waters of the commonwealth.

Effluent limitation - Any restriction imposed by the KPDES permit on quantities, discharge rates, and concentrations of pollutants which are discharged from point sources into waters of the Commonwealth

Effluent limitations guidelines (Effluent Guidelines or ELG) - A regulation published by the Administrator under CWA section 304(b) to adopt or revise effluent limitations.

Environmental Protection Agency, "EPA", or "U.S.EPA" - means the U.S. Environmental Protection Agency.

Eutrophication - means the enrichment of a surface water by the discharge or addition of a nutrient.

Exceptional water (EW) - means a surface water categorized as exceptional by the cabinet pursuant to 401 KAR 10:030.

Existing use - means a legitimate use being attained in or on a surface water of the commonwealth on or after November 28, 1975, irrespective of its use designation.

Expanded discharge - means an increase in pollutant loading.

Facility - means: (a) As used in 401 KAR 5:005 or 401 KAR 5:006, a document issued by the cabinet that authorizes the permittee to construct, modify, or operate a facility; or (b) In 401 KAR 5:050 through 401 KAR 5:080 and if used in conjunction with activity, any KPDES point source, or any other facility, including land or related appurtenances, that is subject to regulation under the KPDES program.

Fact Sheet - A document that must be prepared for all draft KPDES permits, the document summarizes the principal facts and the significant factual, legal, methodological and policy questions considered in preparing the draft permit and explains how the public may comment.

Fecal coliform - means the portion of the coliform group of bacteria that are present in the intestinal tract or the feces of warm-blooded animals. It includes organisms that are capable of producing gas from lactose broth in a suitable culture medium within twenty-four (24) hours at forty-four and five-tenths (44.5) degrees plus or minus two-tenths (0.2) degrees C.

Fundamentally Different Factors (FDF) - Those components of a petitioner's facility that are determined to be so unlike those components considered by EPA during the effluent guidelines and pretreatment standards rulemaking that the facility is worthy of a variance from the effluent guidelines or categorical pretreatment standards that would otherwise apply.

Grab sample -A sample taken from a wastestream on a one-time basis without consideration of the flow rate of the wastestream and without consideration of time.

Groundwater - means the subsurface water occurring in the zone of saturation beneath the water table and perched water zones below the B soil horizon including water circulating through fractures, bedding planes, and solution conduits.

Harmonic mean flow - means the reciprocal of the mean of the reciprocal daily flow values.

Hazardous substance Any substance—as designated under Part 116 pursuant to CWA section 311—that presents an imminent and substantial danger to the public health or welfare, including fish, shellfish, wildlife, shorelines, and beaches, upon discharge to navigable waters of the United States.

High Quality Water (HQ) - means a surface water categorized as high quality by the cabinet pursuant to 401 KAR 10:030.

Impact - means a change in the chemical, physical, or biological quality or condition of a surface water.

Impairment - means a detrimental impact to a surface water that prevents attainment of a designated use.

Indigenous aquatic community - means naturally occurring aquatic organisms including bacteria, fungi, algae, aquatic insects, other aquatic invertebrates, reptiles, amphibians, and fishes. Under some natural conditions one (1) or more of the above groups may be absent from a surface water.

Indirect Discharge - means the introduction of pollutants into a POTW from any non-domestic source regulated under section 307(b), (c) or (d) of the Act.

Industrial User or User - means a source of Indirect Discharge.

Industrial Wastewater Treatment Plant (IWWTP) - means a privately owned WWTP with more than ninety (90) percent of the influent flow from sources of industrial waste.

Infiltration – means water other than wastewater that enters a sewer system (including sewer service connections and foundation drains) from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow.

Inflow – means water other than wastewater that enters a sewer system (including sewer service connections)from sources such as, but not limited to, roof leaders, cellar drains, yard drains, area drains, drains from springs and swampy areas, manhole covers, cross connections between storm sewers and sanitary sewers, catch basins, cooling towers, storm waters, surface runoff, street wash waters, or drainage. Inflow does not include, and is distinguished from, infiltration.

Influent concentration – means the concentration of a pollutant in the raw wastewater received by a POTW.

Inhibition concentration of twenty-five (25) percent (IC_{25}) - means the concentration that is determined by a linear interpolation method for estimating the concentration at which a twenty-five (25) percent reduction is shown in reproduction or growth in test organisms, and which statistically approximates the concentration at which an unacceptable chronic effect is not observed.

Injection - means a type of land application in which the waste is placed directly beneath the land surface.

Instantaneous maximum limit - The maximum allowable concentration or other measure of a pollutant determined from the analysis of any discrete or composite sample collected, independent of the flow rate and the duration of the sampling event.

Instantaneous minimum limit - The minimum allowable concentration or other measure of a pollutant determined from the analysis of any discrete or composite sample collected, independent of the flow rate and the duration of the sampling event.

Interference – means a discharge alone or in conjunction with other discharges from other sources that inhibits or disrupts: (1) a POTW's treatment process or operation that results in the violation or an increase in magnitude or duration of a violation of the POTW's KPDES permit or (2) a POTW's sludge process, use, or disposal that prevents the use or disposal of the sludge in compliance with federal, state, or local regulations.

Intermittent water - means a stream that flows only at certain times of the year.

Interstate agency - means an agency of which Kentucky and one (1) or more states is a member established by or under an agreement or compact, or any other agency, of which Kentucky and one (1) or more other states are members, having substantial powers or duties pertaining to the control of pollution as determined and approved by the secretary or administrator pursuant to 33 U.S.C. 1251 – 1387 or KRS Chapter 224.

Karst - means the type of geologic terrain underlain by carbonate rocks where significant solution of rock has occurred due to flowing groundwater.

Kentucky Index of Biotic Integrity (KIBI) – fish community assessment tool as incorporated by reference in 401 KAR 10:030.

Kentucky Intersystem Operational Permit (KISOP) – means a permit issued pursuant to 401 KAR 5:005, Section 26 for the operation of a publicly or privately owned sewer system that discharges to a WWTP or a sewer system that is owned by another person.

Kentucky No Discharge Operational Permit (KNDOP) - means a permit issued pursuant to 401 KAR 5:005 for operating a WWTP that does not have a discharge to a stream, including agricultural waste handling systems and spray irrigation systems.

Kentucky Pollutant Discharge Elimination System (KPDES) - means the Kentucky program for issuing, modifying, revoking and reissuing, revoking, monitoring and enforcing permits to discharge, and imposing and enforcing pretreatment requirements.

KPDES permit - means a Kentucky Pollutant Discharge Elimination System permit issued to a facility, including a POTW or activity pursuant to KRS Chapter 224 for the purpose of operating the facility or activity.

LC_1 - means that concentration of a toxic substance or mixture of toxic substances that is lethal, or immobilizing if appropriate, to one (1) percent of the organisms tested in a toxicity test during a specified exposure period.

LC_{50} - means that concentration of a toxic substance or mixture of toxic substances that is lethal, or immobilizing if appropriate, to fifty (50) percent of the species tested in a toxicity test during a specified exposure period.

Load Allocation (LA) - The portion of a receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution or to natural background sources. Load allocations are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. Wherever possible, natural and nonpoint source loads should be distinguished.

Macroinvertebrate Bioassessment Index (MBI) – macroinvertebrate community assessment tool as incorporated by reference in 401 KAR 10:030.

Maintain - means to preserve or keep in present condition by not allowing an adverse permanent or long-term change to water quality or to a population of an aquatic organism or its habitat.

Major facility - means a KPDES facility or activity classified as a KPDES facility by the cabinet in cooperation with the regional administrator. Designation as a major industry as used in KRS 224.70-120, does not indicate automatic classification as a major facility.

Maximum Daily Effluent Limitation (MDEL) – means the highest allowable daily discharge of a pollutant.

Measurement - means the ability of the analytical method or protocol to quantify as well as identify the presence of the substance in question.

Method Detection Limit (MDL) - The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

Milligrams per liter (mg/l) - mean the milligrams of substance per liter of solution and are equivalent to parts per million in water, assuming unit density.

Million gallons per day (or mgd) - A unit of flow commonly used for wastewater discharges. One million gallon per day is equivalent to 1.547 cubic feet per second.

Minimum Level (ML) - The level at which the entire analytical system must give a recognizable signal and acceptable calibration point. It is equivalent to the concentration of the lowest calibration standard, assuming that all method-specified sample weights, volumes, and cleanup procedures have been employed.

Mixing zone - means a domain of a water body contiguous to a treated or untreated wastewater discharge with quality characteristics different from those of the receiving water. The discharge is in transit and progressively diluted from the source to the receiving system. The mixing zone is the domain where wastewater and receiving water mix.

Monthly average concentration - means the arithmetic average of all sample concentrations collected during a calendar month.

Monthly Operating Report (MOR) – means a monthly report of the process control monitoring performed on a daily basis by the POTW.

National Pollutant Discharge Elimination System (NPDES) - The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under CWA sections 307, 318, 402, and 405. The term includes approved program. NPDES permits regulate discharges of pollutants from point sources to waters of the United States. Such discharges are illegal unless authorized by an NPDES permit.

National Pretreatment Standard – means any regulation containing pollutant discharge limitations promulgated by the EPA.

Natural Resources Conservation Service (NRCS) - means the organization created pursuant to 7 U.S.C. 6962 in the U.S. Department of Agriculture.

Natural temperature - means the temperature that would exist in waters of the commonwealth without the change of enthalpy of artificial origin, as contrasted with that caused by climatic change or naturally occurring variable temperature associated with riparian vegetation and seasonal changes.

Natural water quality - means those naturally occurring physical, chemical, and biological properties of waters.

Net discharge - means the amount of substance released to a surface water by excluding the influent value from the effluent value if both the intake and discharge are from and to the same or similar body of water.

New Source – means:

(1) any building, structure, facility or installation from which there is or may be a discharge of pollutants, the construction of which commenced after the publication of proposed Pretreatment Standards under section 307(c) of the Act which will be applicable to such source if such Standards are thereafter promulgated in accordance with that section, provided that: (a) The building, structure, facility or installation is constructed at a site at which no other source is located; or (b) The building, structure, facility or installation totally replaces the process or production equipment that causes the discharge of pollutants at an existing source; or (c) The production or wastewater generating processes of the building, structure, facility or installation are substantially independent of an existing source at the same site. In determining whether these are substantially independent, factors such as the extent to which the new facility is integrated with the existing plant, and the extent to which the new facility is engaged in the same general type of activity as the existing source should be considered.

(2) construction on a site at which an existing source is located results in a modification rather than a New Source if the construction does not create a new building, structure, facility or installation meeting the criteria of (1)(ii) or (1)(iii) above, but otherwise alters, replaces, or adds to existing process or production equipment.

(3) Construction of a new source as defined under this paragraph has commenced if the owner or operator has (a) Begun, or caused to begin as part of a continuous onsite construction program: (i) Any placement, assembly, or installation of facilities or equipment; or (ii) Significant site preparation work including clearing, excavation, or removal of existing buildings, structures, or facilities which is necessary for the placement, assembly, or installation of new source facilities or equipment; or (b) Entered into a binding contractual obligation for the purchase of facilities or equipment which are intended to be used in its operation within a reasonable time. Options to purchase or contracts which can be terminated or modified without substantial loss, and contracts for feasibility, engineering, and design studies do not constitute a contractual obligation under this paragraph.

New Source Performance Standards (NSPS) - Technology standards for facilities that qualify as new sources under § 122.2 and § 122.29. Standards consider that the new source facility has an opportunity to design operations to more effectively control pollutant discharges.

Nonconventional pollutant - DOW defines as pollutant not considered to be a conventional pollutant, including priority pollutants identified in 401 KAR 5:060. EPA defines as all pollutants that are not included in the list of conventional or toxic pollutants in Part 40, includes pollutants such as chemical oxygen demand (COD), total organic carbon (TOC), nitrogen, and phosphorus.

Nonexcessive infiltration – means the quantity of flow which is less than 120 gallons per capita per day (domestic base flow and infiltration) or the quantity of infiltration which cannot be economically and effectively eliminated from a sewer system as determined in a cost-effectiveness analysis.

Nonexcessive inflow – means the maximum total flow rate during storm events which does not result in chronic operational problems related to hydraulic overloading of the treatment works or which does not result in a total flow of more than 275 gallons per capita per day (domestic base flow plus infiltration plus inflow). Chronic operational problems may include surcharging, backups, bypasses, and overflows.

Nonpoint Source - Diffuse pollution sources (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet). The pollutants are generally carried off the land by stormwater. Atmospheric deposition and hydromodification are also sources of nonpoint source pollution.

North American Industrial Classification System (NAICS) - The North American Industry Classification System (NAICS) is the standard used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.

Nutrients - Chemical elements and compounds found in the environment that plants and animals need to grow and survive. Nutrients include compounds of nitrogen (nitrate, nitrite, ammonia, organic nitrogen) and phosphorus (orthophosphate and others), both natural and man-made.

Operator - means a person involved in the operation of a facility or activity.

Outfall - means, for municipal separate storm sewers, a point source at the point where a municipal separate storm sewer discharges to waters of the Commonwealth, but does not include open conveyances connecting two (2) municipal separate storm sewers, or pipes, tunnels, or other conveyances that connect segments of the same stream or other waters of the Commonwealth and are used to convey waters of the Commonwealth**.**

Other wastes - means sawdust, bark or other wood debris, garbage, refuse, ashes, offal, tar, oil, chemicals, acid drainage, wastes from agricultural enterprises, and other foreign substances not included within the definitions of industrial wastes and sewage that may cause or contribute to the pollution of waters of the Commonwealth.

Outstanding National Resource Water (ONRW) - means a surface water categorized by the cabinet as an outstanding national resource water pursuant to 401 KAR 10:030.

Outstanding State Resource Water (OSRW) means a surface water designated by the cabinet as an outstanding state resource water pursuant to 401 KAR 10:031.

Overflow - means any intentional or unintentional diversion of flow from a facility.

Owner - means a person who has legal ownership of a facility or activity regulated pursuant to 401 KAR Chapter 5.

Pass Through – means a discharge that exits a POTW into waters of the Commonwealth in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation or increase in magnitude or duration of a violation of any requirement of the POTW's KPDES permit.

Percent Removal – A percentage expression of the removal efficiency across a treatment plant for a given pollutant parameter, as determined from the 30-day average values of the raw wastewater influent pollutant concentration to the facility and 30-day average values of the effluent pollutant concentrations for a given time period.

Permitting Authority - means the agency authorized to issue and enforces specific requirements of the NPDES permit program. The permitting authority may be EPA, or a state, territorial, or tribal agency that has been authorized under CWA section 402(b) to administer the NPDES program within its jurisdiction.

pH - A measure of the hydrogen ion concentration of water or wastewater; expressed as the negative log of the hydrogen ion concentration in mg/L. A pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is basic.

Plan of study means (1) a report that contains the following information required for a regional facility plan by 401 KAR 5:006, Section 4: (a) Planning area maps; (b) A discussion of the need for sewer service in the area; (c) Population projections; and (d) An estimation of the twenty (20) year cost by category; or (2) a plan required by the permit for the purposes of collecting data to determine background stream physical, chemical and biological conditions and discharge conditions.

Point source - means any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, culvert, tunnel, conduit, well, discrete fissure, container, wet seals, mine adits, seeps, or sumps, from which pollutants are or may be discharged.

Pollutant - Dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended [42 U.S.C. 2011 et seq.)], heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean a. Sewage from vessels. b. Water, gas, or other material that is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by authority of the state in which the well is located, and if the state determines that the injection or disposal will not result in the degradation of ground or surface water resources.

Pollutant, Conservative - Pollutants that do not readily degrade in the environment and that are mitigated primarily by dilution after entering receiving waters (e.g., metals, total suspended solids).

Pollutant, Non-Conservative - Pollutants that are mitigated by natural biodegradation or other environmental decay or removal processes in the receiving water after mixing and dilution have occurred (e.g., biochemical oxygen demand, pH, volatile organic compounds

Pretreatment - means the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such

pollutants into a POTW. The reduction or alteration may be obtained by physical, chemical or biological processes, process changes or by other means, except as prohibited by § 403.6(d). Appropriate pretreatment technology includes control equipment, such as equalization tanks or facilities, for protection against surges or slug loadings that might interfere with or otherwise be incompatible with the POTW. However, where wastewater from a regulated process is mixed in an equalization facility with unregulated wastewater or with wastewater from another regulated process, the effluent from the equalization facility must meet an adjusted pretreatment limit calculated in accordance with § 403.6(e).

Pretreatment Requirements - means any substantive or procedural requirement related to Pretreatment, other than a National Pretreatment Standard, imposed on an Industrial User.

Primary Contact Recreation Water (PCRW) - means those waters suitable for full body contact recreation during the recreation season of May 1 through October 31.

Primary Industry Category - Any industry category listed in the NRDC settlement agreement (Natural Resources Defense Council et al. v. Train, 8 E.R.C. 2120 [D.D.C. 1976], modified 12 E.R.C. 1833 [D.D.C. 1979]); also listed in Appendix A of Part 122.

Primary responsibility - means personal, first-hand responsibility to conduct or actively oversee and direct procedures and practices necessary to ensure that the wastewater treatment plant or wastewater collection system is operated in accordance with accepted practices and with KRS Chapter 224 and 401 KAR Chapters 5 and 11 having the authority to conduct the procedures and practices necessary to ensure that the wastewater system or any portion thereof is operated in accordance with accepted practices, laws, and administrative regulations of the commonwealth, or to supervise others in conducting these practices.

Priority Pollutants - Those pollutants considered to be of principal importance for control under the CWA based on the NRDC Consent Decree (NRDC et al. v. Train, 8 E.R.C. 2120 [D.D.C. 1976], modified 12 E.R.C. 1833 [D.D.C. 1979]); a list of the pollutants is provided as Appendix A to 40 CFR Part 423.

Privately-owned treatment works - means any device or system which is (a) used to treat wastes from any facility whose operator is not the operator of the treatment works and (b) not a "POTW."

Process Wastewater - Any water [that], during manufacturing or processing, comes into direct contact with, or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product.

Production-Based Standard - A discharge standard expressed in terms of pollutant mass allowed per unit of product manufactured or some other measure of production. 1996 PWM

Productive aquatic community - means an assemblage of indigenous aquatic life capable of reproduction and growth.

Professional engineer or engineer is defined by KRS 322.010(2).

Propagation - means the continuance of a species by successful spawning, hatching, and development or natural generation in the natural environment, as opposed to the maintenance of the species by artificial culture and stocking.

Proposed permit - means a KPDES permit prepared after the close of the public comment period and, if applicable, any public hearing and administrative appeals that is sent to U.S. EPA for review before final issuance by the cabinet. A proposed permit is not a draft permit.

Publicly Owned Treatment Works or POTW – means any device or system used in the treatment, including recycling and recovery of municipal sewage or industrial wastes of a liquid nature which is owned by the Commonwealth or a political subdivision of the Commonwealth, including the sewers, pipes and other conveyances that convey wastewater to the treatment plant.

Public water system - means a system for the provision to the public of water for human consumption through pipes or, after August 5, 1998, other constructed conveyances, if such system has at least fifteen service connections or regularly serves an average of at least twenty-five individuals daily at least 60 days out of the year. Such term includes: any collection, treatment, storage, and distribution facilities under control of the operator of such system and used primarily in connection with such system; and any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. Such term does not include any "special

irrigation district." A public water system is either a "community water system" or a "non-community water system."

RCRA - means the Resource Conservation Recovery Act as amended, 42 U.S.C. 6901 - 6992k.

Recommencing discharger - means a source that recommences discharge after terminating operations.

Recurring discharge - means, as it relates to a sewer system overflow, a discharge that occurs two (2) or more times in a twelve (12) month period.

Regional administrator - means the regional administrator of the Region IV office of the U.S. EPA or the authorized representative of the regional administrator.

Removal Credits – means credit given to an industrial user for the removal a pollutant by a POTWs treatment plant. The credit is given at the discretion of the POTW and cannot exceed the removal rate of the POTW's treatment plant for that pollutant.

Representative indicator organism - means an aquatic organism designated for use in toxicity testing because of its relative sensitivity to toxicants and its widespread distribution in the aquatic environment.

Run-off coefficient - means the fraction of total rainfall that will appear at a conveyance as run-off.

Sanitary Sewer Overflow – means untreated or partially treated sewage overflows from a sanitary sewer collection system.

SARA - means the Superfund Amendments and Reauthorization Act, 42 U.S.C. 9601 – 9675.

Schedule of Compliance - means a schedule of remedial measures included in a permit, including an enforceable sequence of interim requirements leading to compliance with KRS Chapter 224 and 401 KAR Chapters 4 through 11.

Secondary Contact Recreation Waters (SCRW) - means those waters suitable for partial body contact recreation, with minimal threat to public health due to water quality.

Section 304(a) Criteria - Developed by EPA under authority of CWA section 304(a) based on the latest scientific information on the relationship that the effect of a constituent concentration has on particular aquatic species and/or human health. This information is issued periodically to the states as guidance for use in developing criteria.

Self-Monitoring - Sampling and analyses performed by a facility to determine compliance with effluent limitations or other regulatory requirements.

Seven-Q-ten or "$7Q_{10}$" - means that minimum average flow that occurs for seven (7) consecutive days with a recurrence interval of ten (10) years.

Significant Industrial User (SIU) – means an indirect discharger that is the focus of control efforts under the national pretreatment program; includes all indirect dischargers subject to national categorical pretreatment standards, and all other indirect dischargers that contribute 25,000 gpd or more of process wastewater, or which make up five percent or more of the hydraulic or organic loading to a municipal treatment plant, subject to certain exceptions [40 CFR 403.3(t)]

Sinkhole - means a naturally occurring topographic depression in a karst area. Its drainage is subterranean and serves as a recharge source for groundwater. It is formed by the collapse of a conduit or the solution of bedrock.

Site - means, as used in 401 KAR 5:060 through 5:080, the land or water area where a facility or activity is physically located or conducted, including adjacent land used in connection with the facility or activity.

Sewage Sludge – is a solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works (401 KAR 5:065, Section 2(10) [40 CFR 503.9(w)]

Source - means a building, structure, facility, or installation from which there is or may be a discharge of pollutants.

Spill Prevention Control and Countermeasure Plan (SPCC) - A plan prepared by a facility to minimize the likelihood of a spill and to expedite control and cleanup activities if a spill occurs. Such plans are required for certain facilities under the Oil Pollution Prevention Regulations at 40 CFR 112.

Standard Industrial Classification (SIC) Code - A code number system used to identify various types of industries. A particular industry may have more than one SIC code if it conducts several types of commercial or manufacturing activities onsite. An online version of the 1987 SIC Manual <www.osha.gov/pls/imis/sic_manual.html> is available courtesy of the Occupational Safety & Health Administration (OSHA).

STORET - EPA's computerized STOrage and RETrieval water quality data base that includes physical, chemical, and biological data measured in waterbodies throughout the United States. 1996 PWM

Storm Water (or Stormwater) Stormwater runoff, snow melt runoff, and surface runoff and drainage.

Supernatant - means the water that accumulates in the upper portion of a lagoon and contains not greater than two and zero-tenths (2.0) percent total solids by dry weight analysis.

Surface waters - means those waters having well-defined banks and beds, either constantly or intermittently flowing; lakes and impounded waters; marshes and wetlands; and any subterranean waters flowing in well-defined channels and having a demonstrable hydrologic connection with the surface. Lagoons used for waste treatment and effluent ditches that are situated on property owned, leased, or under valid easement by a permitted discharger are not considered to be surface waters of the commonwealth.

Technology-Based Effluent Limitation (TBEL) – means an effluent limit for a pollutant that is based on the capability of a treatment method to reduce the pollutant to a certain concentration or mass loading level. TBELs for POTWs are derived from the secondary treatment regulations in Part 133 or state treatment standards. TBELs for non-POTWs are derived from effluent guidelines, state treatment standards, or by the permit writer on a case-by-case basis using best professional judgment.

Tiered permit limits - Permit limits that apply to the discharge only when a certain threshold (e.g., production level), specific circumstance (e.g., batch discharge), or time frame (e.g., after 6 months, during the months of May through October) triggers their use. Adapted from 1996 PWM

Total Dissolved Solids (TDS) - means the total dissolved solids (filterable residue) as determined by use of the method specified in 40 CFR Part 136.

Total Maximum Daily Load (TMDL) - The sum of the individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background. If a receiving water has only one point source discharger, the TMDL is the sum of that point source WLA plus the LAs for any nonpoint sources of pollution and natural background sources, tributaries, or adjacent segments. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure. If best management practices (BMPs) or other nonpoint source pollution controls make more stringent load allocations practicable, then wasteload allocations can be made less stringent. Thus, the TMDL process provides for nonpoint source control tradeoffs.

Total Suspended Solids (TSS) - means the total suspended solids (non-filterable residue) as determined by use of the method specified in 40 CFR Part 136.

Toxic Pollutant - Any pollutant listed as toxic under CWA section 307(a)(1) or, in the case of sludge use or disposal practices, any pollutant identified in regulations implementing CWA section 405(d).

Toxic substance - means a substance that is bioaccumulative, synergistic, antagonistic, teratogenic, mutagenic, or carcinogenic and causes death, disease, a behavioral abnormality, a physiological malfunction, or a physical deformity in an organism or its offspring or interferes with normal propagation.

Toxicity Reduction Evaluation (TRE) - A site-specific study conducted in a step-wise process designed to identify the causative agent(s) of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity.

Toxicity Test – means a procedure to determine the toxicity of a chemical or an effluent using living organisms. A toxicity test measures the degree of effect on exposed test organisms of a specific chemical or effluent.

Treatability Manual - Five-set library of EPA guidance manuals that contain information related to the treatability of many pollutants. The manual may be used in developing effluent limitations for facilities and pollutants, which, at the time of permit issuance, are not subject to industry-specific effluent guidelines. The five volumes that comprise this series consist of Volume I – Treatability Data (EPA-600/8-80-042a); Volume II – Industrial Descriptions (EPA-600/8-80-042b); Volume III – Technologies (EPA-600/8-80- 042c); Volume IV – Cost Estimating (EPA-600/8-80-042d); and Volume V – Summary (EPA-600/8-80-042e).

UIC - means Underground Injection Control.

Underground injection control well - means a well used for the emplacement of fluids into the subsurface.

Upset - means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

Variance - means a mechanism or provision pursuant to 401 KAR Chapter 5 that allows modification to or waiver of the generally applicable effluent limitation requirements or time deadlines.

Warm Water Aquatic Habitat (WAH) - means a surface water and associated substrate capable of supporting indigenous warm water aquatic life.

Water or Waters of the Commonwealth means and includes any and all rivers, streams, creeks, lakes, ponds, impounding reservoirs, springs, wells, marshes, and all other bodies of surface or underground water, natural or artificial, situated wholly or partly within or bordering upon the Commonwealth or within its jurisdiction

Water Quality Management Plan (WQM plan) - means: (a) A plan consisting of initial plans produced in accordance with 33 U.S.C. 1288 and 1313 and certified and approved updates to those plans; or (b) A state or area-wide waste treatment management plan developed and updated in accordance with 33 U.S.C. 1281, 1285j, 1288, and 1313e and 40 CFR Part 130.

Water Quality Standard - means an administrative regulation promulgated by the cabinet establishing the designated use of a surface water and the water quality criteria necessary to maintain and protect that designated use.

Water Quality-Based Effluent Limit(s) - means effluent limits derived from Kentucky's Water Quality Standards.

Well or water well - means any excavation or opening in the surface of the earth that is drilled, cored, bored, washed, driven, jetted, or otherwise constructed when the actual or intended use in whole or part of an excavation is the removal of water for any purpose, including but not limited to culinary and household purposes, animal consumption, food manufacture, use of geothermal resources for domestic heating purposes and industrial, irrigation, and dewatering purposes, but not including wells to be used for watering stock or for general farmstead use if the wells do not provide water for human consumption

Wellhead protection area - means: (a) The surface and subsurface area surrounding a water well, well field, or spring, supplying a public water system, through which pollutants are reasonably likely to move toward and reach the water well, well field, or spring; or (b) An area defined as a wellhead protection area in a county water supply plan.

Wetlands - means land that has a predominance of hydric soils and that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.

Zone of Initial Dilution (ZID) - means the limited area permitted by the cabinet surrounding or downstream from a discharge location where rapid, first-stage mixing occurs. The zone of initial dilution is the domain where wastewater and receiving water initially mix.

ACRONYMS AND ABBREVIATIONS			
Acronym or abbreviation	**Full phrase**	**Acronym or abbreviation**	**Full phrase**
7Q10	7-day, 10-year Low Flow	**ML**	Minimum Level
ACR	Acute-to-Chronic Ratio	**N/A**	Not Applicable
AML	Average Monthly Limitation	**NEMI**	National Environmental Methods Index
ASR	Alternative State Requirement	**NOAA**	National Oceanic and Atmospheric Administration
AWL	Average Weekly Limitation	**NOEC**	No Observable Effect Concentration
BAT	Best Available Technology Economically Achievable	**NPDES**	National Pollutant Discharge Elimination System
BCT	Best Conventional Pollutant Control Technology	**O&G**	Oil and Grease
BPJ	Best Professional Judgment	**°C**	Degrees Centigrade or Celsius
BPT	Best Practicable Control Technology Currently Available	**°F**	Degrees Fahrenheit
CAH	Cold Water Aquatic Habitat	**ONRW**	Outstanding National Resource Water
CFR	*Code of Federal Regulations*	**OSRW**	Outstanding State Resource Water
cfs	Cubic Feet per Second	**PCR**	Primary Contact Recreation
CSO	Combined Sewer Overflow	**PSNS**	Pretreatment Standard New Source
CWA	Clean Water Act	**RBP**	Rapid Bioassessment Protocol
DMP	Division of Mine Permits	**SCR**	Secondary Contact Recreation
DMR	Discharge Monitoring Report	**SIC**	Standard Industrial Classification
DO	Dissolved Oxygen	**SIU**	Significant Industrial User
EL	Effluent Limit	**SPCC**	Spill Prevention Control and Countermeasure
ELG	Effluent Limitations Guidelines or Effluent Guidelines	**SS**	Settleable Solids
ELGF	Effluent Limitation Guideline Factor	**SSO**	Sanitary Sewer Overflow
EPA	U.S. Environmental Protection Agency	**STORET**	EPA Storage and Retrieval Database
ESA	Endangered Species Act	**SU**	Standard Units
EW	Exceptional Water	**TBEL**	Technology-Based Effluent Limit(s)
FR	*Federal Register*	**TIE**	Toxicity Identification Evaluation
FWS	U.S. Fish and Wildlife Service	**TMDL**	Total Maximum Daily Load
GC/MS	Gas Chromatography/Mass Spectroscopy	**TRE**	Toxicity Reduction Evaluation
gpd	Gallons per Day	**TSD**	Technical Support Document for Water Quality-based Toxics Control
HQ	High Quality Water	**TSS**	Total Suspended Solids
IC	Inhibition Concentration	**TTO**	Total Toxic Organics
KIBI	Kentucky Index of Biological Integrity	**TU**	Toxic Units
LA	Load Allocation	**TU_A**	Toxic Units – Acute
lbs/day	Pounds per Day	**TU_c**	Toxic Units – Chronic
LC_1	Lethal Concentration to 1% of test organisms	**TWTDS**	Treatment Works Treating Domestic Sewage

ACRONYMS AND ABBREVIATIONS			
Acronym or abbreviation	**Full phrase**	**Acronym or abbreviation**	**Full phrase**
LC_{50}	Lethal Concentration to 50% of test organisms	**U.S.C.**	*United States Code*
LOEC	Lowest Observed Effect Concentration	**UAA**	Use Attainability Analysis
LTA	Long-Term Average	**USGS**	United States Geological Survey
LTCP	Long-Term Control Plan	**WET**	Whole Effluent Toxicity
MBI	Macroinvertebrate Bioassessment Index	**WLA**	Waste Load Allocation
MDEL	Maximum Daily Effluent Limitation	**WQBEL**	Water Quality-Based Effluent Limit(s)
MDL	Method Detection Limit	**WQS**	Water Quality Standard(s)
MEP	Maximum Extent Practicable	**µg/L**	Micrograms per Liter
mg/L	milligrams per liter	**ρCi/l**	Pico Curies per Liter
MGD	Million Gallons per Day		