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Source Document for IDEM September 16, 2006 Presentation on Terms for Discussion of Antidegradation *De Minimis* Policy Options

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A. Purpose of presentation

"assimilative capacity is a natural resource"
= difference between WQC and "ambient water quality" (by USEPA)

B. Where we are in rulemaking process

C. Concepts for Focused Discussion on De Minimis

(What is the amount of *de minimis* reduction of **assimilative capacity** that is not a significant lowering of water quality?)

1. Legal Context of Waterbodies for this Antidegradation Rulemaking

a) All Indiana waters of the State

b) All federal navigable waters in Indiana
(significant lowering shall be necessary to accommodate important social or economic development in the area)

c) All waters in Great Lakes Basin (federal law)

d) All waters in Indiana Outstanding State Resource Water (+Exceptional Use)

2. High Quality Water

(EPA allows by water body, by parameter or by combination of the two; Indiana currently assigns by parameter)

a) Toxicity – Numeric Values by Parameter

i) Water Quality Criteria written in Indiana regulation

ii) No criteria in regulation but use process to develop a numeric value for a toxicity parameter
= Water Quality Value (or Tier 2 value)

iii) Whole Effluent Toxicity (WET)
Process to establish a WQBEL based on effluent-specific WET results

b) Pollution that has no direct toxicity on organisms
Narrative criteria (e.g. parameters that together could reduce dissolved oxygen concentration in water body at specific time)
Permit limit approached by technology-based limit
Examples are Phosphate, Total Suspended Solids and Oil and Grease
Heat is addressed related to impact on receiving water

3. WLA Assimilative Capacity (in IN = Loading Capacity)

The permit process calculates the acceptable waste load allocation (WLA) for each parameter and then adds statistical conservatisms for practicality of measurements to transform that value into an enforceable WQBEL.

Human, wildlife and aquatic protection criteria are put into a WLA calculation using different assumptions, with the lowest resulting WLA being used to calculate the single WQBEL in the permit.

Because **chronic aquatic criteria** is usually the must constraining, the examples used here will be based on that.

- **New** discharge permit limit allowed:

$$WLA_{\text{chronic aquatic}} = WQC + 0.25\mathbf{(WQC - C_b)Q_s}/Q_{pe}$$

Where

$WLA_{\text{chronic aquatic}}$ = Wasteload Allocation based on chronic aquatic criteria

WQC = Water Quality Criteria – chronic aquatic

C_b = background concentration

Q_s = allowed upstream stream <u>flow</u> for calculation, called design stream flow

(for chronic aquatic in IN = low flow at 7Q10)

Q_{pe} = proposed allowed effluent <u>flow</u> in permit (industry = max monthly ave;

municipal POTW = ave design flow)

$(WQC - C_b)$ = concentration-based available assimilative capacity for WLA calculation

Q_s/Q_e = amount of dilution of the discharger effluent flow by the low flow receiving water

- **Expansion of existing** permit limit for allowed increased discharge:

$$WLA_{\text{chron aquat}} = \frac{0.25(WQC - C_b)Q_s + (WQC)Q_{ee} + \mathbf{WQC(increment\ increase\ in\ effluent\ flow)}}{Q_{pe}}$$

Where

WLA_e = Wasteload Allocation based on chronic aquatic criteria <u>for the existing permit</u>

Q_{ee} = existing effluent flow

Q_{pe} = existing effluent flow + proposed increase

4. **Antidegradation Assimilative Capacity**

a. Assimilative Capacity (TAC) = Indiana Loading Capacity

Mass load is always added to a water body accompanied by addition of water;

Policy Question: what is the flow on which "assimilative capacity" is to be based to determine whether a proposed load would be significant lowering of water quality?
(Upstream or downstream of discharger?
At fixed point in time or at each time decision is made to increase load?)

TAC = (WQC)(Flow)

Unused Assimilative Capacity =
TAC – $(Q_s)(C_b)$– (effluent flows)(effluent concentrations)

b. Flow for Assimilative Capacity Determination for Antidegradation
(function of time and location on the water body)

i) "random" real summer flows
- used for Impaired Water Assignment; TMDL Program
- used for "representative" background

ii) Stream Design Flow – 7Q10

iii) Stream Design Flow + Existing Effluent Flow

- lock in at time of first approved permit
- total of all permitted effluent flows

iv) Stream Design flow + Existing flows + Proposed flow
(i.e. = WLA assimilative capacity assumption)

D. Examples
Comparing WQBEL vs de minimis percent of unused assimilative capacity in real permit decisions

1. New Discharge
Below 10 % Unused Assimilative Capacity
(Unused Loading Capacity)
As long as at least 10% Total Assimilative Capacity
(Total Loading Capacity) remains unused

2. Expansion of Existing Discharge
Below 10 % Unused Assimilative Capacity
(Unused Loading Capacity)
As long as at least 10% Total Assimilative Capacity
(Total Loading Capacity) remains unused