STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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March 17, 2014

To: Attendees of the March 21, 2014 DEP/EPA/MWWCA meeting

RE: Phosphorus Limits in MEPDES/WDL

Dear Interested Parties:

This letter is to inform you of how the Department of Environmental Protection (Department) intends to determine the need for water quality based phosphorus limits in Maine Pollutant Discharge Elimination System Permit/Waste Discharge Licenses (MEPDES/WDL). This issue has been the topic of discussion between the Environmental Protection Agency (EPA) and the Department for the last several months based on recent EPA comments on draft MEPDES/WDL and recent EPA guidance documents on this issue.

Regulatory Authority

Department Regulation, Chapter 523 specifies that water quality based limits are necessary when it has been determined that a discharge has reasonable potential (RP) to cause or contribute to an excursion above any State water quality standard including State narrative criteria.[1, 2] In addition, Chapter 523 specifies that water quality based limits may be based upon criteria derived from a proposed State criterion, or an explicit State policy or regulation interpreting its narrative water quality criterion, supplemented with other relevant information which may include: EPA's Water Quality Standards Handbook, October 1983, risk assessment data, exposure data, information about the pollutant from the Food and Drug Administration, and current EPA criteria documents; or using EPA's Water quality criteria, published under section 304(a) of the CWA supplemented where necessary by other relevant information.[3]

Recent comments from EPA indicate that all permits for discharges to fresh waters must contain a reasonable potential analysis to determine if water quality based limits are needed for phosphorus. It is known that phosphorus is a limiting nutrient in fresh waters. At certain concentrations, under certain conditions, phosphorus may cause

[1] *Waste Discharge License Conditions,* 06-096 CMR 523(5)(d)(1)(i) (effective date January 12, 2001)
[2] State narrative water quality criteria include things such as descriptions on allowable impacts to aquatic habitat and references to water quality necessary to support various designated uses such as recreation in and on the water. Standards for the Classification of Fresh Surface Waters that contain narrative water quality criteria may be found at 38 MRSA Sec. 465.
[3] 06-096 CMR 523(5)(d)(1)(vi)(A)

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impacts such as algal blooms and changes in macro-invertebrate populations that would cause non-attainment of water quality standards.

Reasonable Potential (RP) Calculation:
The RP calculation to determine if a phosphorus limit is needed consists of the following:

$$Cr = \frac{QeCe + QsCs}{Qr}$$

Qe = effluent flow (i.e. facility design flow)
Ce = effluent pollutant concentration
Qs = 7Q10 flow of receiving water
Cs = upstream concentration (background)
Qr = receiving water flow (Qs +Qe)
Cr = receiving water concentration

Based on this calculation, if the resulting concentration (Cr) is above the numeric phosphorus criterion for the receiving water, the discharge is determined to have a reasonable potential to cause or contribute to an excursion above a State water quality standard and a phosphorus limit must be included in the permit to prevent this excursion.

Numeric Phosphorus Criteria for the Receiving Water
It is noted that the Department has developed a draft rule (*Nutrient Criteria for Surface Waters*, Chapter 583) that establishes nutrient criteria for surface waters. Methods described in the draft rule are intended to make decisions about attainment or impairment of designated and existing uses of surface waters. The draft rule specifies that nutrient criteria consist of a variety of environmental response indicators (such as percent algal cover, chlorophyll a, dissolved oxygen, etc.) and numeric nutrient indicators (total phosphorus) linked together. The draft rule further specifies that impairment is determined only if one or more of the environmental response indicators is not met. A water body cannot be determined to be impaired solely due to an exceedence of the phosphorus numeric nutrient indicator.[4, 5] The phosphorus numeric

[4] The utilization of environmental response indicators as the primary indicator for determining attainment or impairment with water quality standards is a scientifically sound practice that recognizes the variability of phosphorus impacts in receiving waters. Phosphorus impacts are known to vary widely based on the site-specific characteristics of the receiving waters such as water depth, velocity, and shading that affect how phosphorus reacts in the receiving water.

[5] However, recent EPA guidance states that, "If a causal parameter is exceeded and data are unavailable for any applicable response parameters, then the criterion is not met and the waterbody is not meeting its designated uses." *Guiding Principles on an Optional Approach for Developing and Implementing a Numeric Nutrient Criterion that Integrates Causal and Response Parameters*, EPA, September 2013 (see Section II.C.5.d)

nutrient indicators in the draft rule are as follows: Class A: 18 ug/L, Class B: 30 ug/L, Class C: 33 ug/L. These values were derived based on Maine data.

While it was never the Department's intent to use the draft rule phosphorus numeric nutrient indicators in an RP calculation, (and therefore, in isolation from the numeric response indicators), recent EPA guidance on this issue makes it clear that a numeric nutrient indicator must be used in this manner[6].

In light of the recent EPA guidance and comments on this issue, the Department will continue to evaluate the structure of the draft rule and will consider options for moving forward.

USEPA's Quality Criteria for Water 1986 (Gold Book) puts forth an in-stream phosphorus concentration recommendation of less than 100 µg/L in streams or other flowing waters not discharging directly to lakes or impoundments to prevent nuisance algal growth. The use of the 100 ug/L Gold Book standard is consistent with the requirements of Chapter 523 noted above for use in a RP calculation. Until Chapter 583, *Nutrient Criteria for Surface Waters*, is finally promulgated; the Department has chosen to utilize the EPA Gold Book standard of 100 ug/L total phosphorus as an interim criterion (rather than the numeric nutrient indicators in the draft rule) solely for the purposes of the RP calculation. It is the Department's intent to continue to make determinations of actual attainment or impairment based upon environmental response indicators from specific water bodies. We expect the actual numeric nutrient indicators for phosphorus will remain at or near the numbers established in the draft rule, though this is subject to further analysis.

The interim use of the Gold Book standard of 100 ug/L for use in the RP calculation will enable the Department to establish water quality based limits, while providing an opportunity to acquire environmental response indicator data, background phosphorus data, and facility effluent phosphorus data as needed to refine the establishment of site specific water quality based limits for phosphorus. Therefore, permits may be reopened during the term of the permit to modify any RP calculation, phosphorus limits, or monitoring requirements based on site-specific data. The Department will use the numeric nutrient indicators from draft Regulation Chapter 583 as a screening tool to determine when site-specific environmental response indicator data may be required to be monitored as a condition of a permit.

Permit Limit Development

The attached table indicates the three possible results for an RP calculation using the interim 100 ug/L criteria and the draft Chapter 583 criteria as a screening tool. Since the existing data set for effluent phosphorus concentrations and receiving water background concentration is in some cases very limited, and since these data are

[6] *Guiding Principles on an Optional Approach for Developing and Implementing a Numeric Nutrient Criterion that Integrates Causal and Response Parameters*, EPA, September 2013 (see Section III.B.2.)

necessary for an accurate assessment of reasonable potential, the Department intends to require collection of this data in most cases. The Department will develop protocols for the collection of this data.

In some cases, there may be completed water quality models for some dischargers that will influence how a facility is regulated instead of the simple reasonable potential calculation. In addition, some receiving waters will require the development of a water quality model or multiple discharge allocation to assure assimilative capacity for all dischargers particularly in the lower section of rivers with multiple dischargers and high background levels (such as the Kennebec). Finally, there may be site-specific considerations for some dischargers that will affect how they are regulated.

The need for water quality based phosphorus limits will be developed at permit renewal. In some cases, such as when there is a need for multiple discharger allocations, permits may be reopened to establish phosphorus limits for all dischargers to the receiving water at the same time.

The Department intends to establish phosphorus limits as monthly average quantity limits in lbs/day of total phosphorus. A compliance schedule for the limit may be included in the permit as allowed by law.

Please feel free to contact me with any comments or questions. I look forward to our discussion on March 21, 2014.

Sincerely,

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