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First Summary Report for IP XL-2 Project
Initial Evaluation of COD Balance

Introduction

At previous meetings of the Collaborative Group, a number of projects have been identified which should reduce the release of COD from the pulp mill. However, for proper evaluation of the effectiveness and desirability to implement the various projects, a ranking framework and baseline are needed. The Technical Team decided at its July 12th meeting at the DEP office in Portland, ME, to perform a mill-wide COD balance. Such a balance will be used to rank the various COD sources in terms of their contribution to the COD released with the effluent following treatment in the wastewater treatment plant. The COD balance would also permit determination of the effectiveness of the various projects that have been identified as potential reductions of COD exiting the mill. It would also assist in determining if a change of scope is necessary to meet the goals of the XL project. Consequently, a meeting was held on August 7, 2000 at Jay, Maine to discuss performing such a balance. This report summarizes our thoughts on how such a balance might be performed.

Objective of a Mill-Wide COD Balance

The objective of a mill-wide COD balance is to rank the relative contribution of the various COD point sources going to the waste treatment plant. It will also form the basis for a COD reduction plan prepared by the Technical Team for consideration by the Collaborative Team. Moreover, a baseline is needed to verify the impact of the implementation of the various projects on the final effluent quality.

Protocol to be Used in the COD Balance Protocol

We concur with the protocol for performing the COD balance on the entire IP Jay production operation per our discussions with Messer's Sekerak and Treadwell. All the major COD point sources going to the wastewater treatment facility appear to have been identified. Sampling for COD content and determination of the flow rate at these locations will allow the Technical Team to establish a mill-wide COD mass balance. Messers Sekerak and Treadwell may wish to expand the testing to include performing the BOD and Microtox™ tests.

Sampling Procedure

Twenty-four (24) hour composite sampling should be adequate. Taking three samples at each location on successive days should permit short-term variance to be determined. Identification of twenty sampling sites, including that of the influent and effluent from the treatment plant, appears to be adequate for a complete balance to be made.

Total Mass Balance

The balance should include both the total mass (flow) and the COD. The balance should include all major sources going to the waste treatment system. The total flow rate going to the waste treatment system should be determined and should equal the flow rate of the various point sources. The influent raw water from the river must be sampled together with a sample of water leaving the water treatment plant. The COD contribution to the waste treatment system from the raw water ($m_{COD,\ Raw\ Water}$) can be estimated from the equation:

$$m_{COD,\,RawWater} = Q[C_{in} - C_{out}] = Lbs\ COD / Day$$

where Q = raw water flow rate (gallons per day)
C_{in} = COD concentration of raw water from river (lbs/gal.)
C_{out} = COD concentration in fresh water going to process (lbs/gal)

Likewise COD samples should be taken after the waste treatment plant to determine the total reduction in COD across the waste treatment system. After the balance is completed, each point source in the mill should be ranked and compared to that coming from the pulp mill and bleach plant, that is the sources covered in the XL project.

A shortcoming in performing the COD balance is that it only ranks the incoming point sources and how well the treatment plant is performing on a global basis; it says nothing about how well each input stream is being treated.

BOD Testing

Due to the above shortcoming, we recommend that the various samples also be tested for BOD as was done in the initial sampling. BOD testing will lead to additional expense but would be worth the price because of the additional information generated. This would permit determination of the ratio between the COD and BOD in the various sample and further ranking of the sources as to how well the various contributions are degraded by the waste treatment facility. This will allow estimation of how much each source contributes to the final end-of-pipe effluent going to the river. A source that has a high COD but low BOD would be particularly troublesome. Some data exists in this regard from the data presented at our June 7th meeting, but this would be a systematic look at all the mill sources.

Samples for Microtox® Testing

We also recommend that samples be analyzed for toxicity using the Microtox® screening test. The Microtox™ test is relatively quick and simple and avoids complicated toxicity testing. However, it would provide further input for ranking the various point sources. If Microtox™ testing is too expensive or complicated, then alternatively, the samples could be kept frozen so that at a latter stage they could be assessed for toxicity if it becomes necessary and/or the technical team feels that it is warranted.

Sincerely yours,

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