HDR 2008 Report to the NWPPA: *"Increasing the Fish Consumption Rate: Report of Fiscal Impact to Select Northwest Pulp & Paper Mills"*

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BACKGROUND

In November 2008, HDR completed a report for the Northwest Pulp and Paper Association (NWPPA) entitled *Increasing the Fish Consumption Rate: Report of Fiscal Impact to Select Northwest Pulp & Paper Mills*. The report examined wastewater effluent discharges at four Oregon paper mills and compared discharge rates to baseline and various proposed human health water quality criteria (HHWQC), examined potential treatment technology feasibility, and provided opinions of capital and operating costs the mills would incur to meet proposed more stringent human-health based Water Quality Standards (WQS).

During 2009-2010, the Oregon Department of Environmental Quality (ODEQ) convened an advisory committee referred to as the Rulemaking Work Group (RWG) to review policy decisions, implementation tools, and proposed rule language as the ODEQ moves to adopt new human-health based WQS based on a fish consumption rate (FCR) of 175 grams per day (g/d). Several policy changes have occurred since the inception of the RWG that impact NWPPA member mills including:

- ODEQ has proposed a revised human health As WQS of 2.3 microgram per liter (ug/L) at the 175 g/d FCR
- Environmental Protection Agency (EPA) Region 10's approval of the withdrawal of the Be HHWQC and ODEQ's proposed withdrawal of Fe and Mn limits from HHWQC standards.
- EPA Region 10's rejection of Oregon's water quality criteria based on 17.5 g/d fish consumption rate, thereby returning the current "baseline" water quality criteria to a 6.5 g/d fish consumption rate.
- ODEQ's draft proposal of a "Background Pollutant Allowance" that would allow for pass-through of pollutants from a discharger's intake water to the receiving water (providing the two are hydraulically connected).

This Addendum to the 2008 Report uses updated data and information recently provided by NWPPA and its members to summarize the fiscal impacts of these recent RWG policy changes to NWPPA members.

COST IMPACTS

The 2008 Report concluded that it was unclear whether the alternatives evaluated could reliably meet proposed HHWQC. However, order-of-magnitude opinions of probable construction and operating costs were developed in the 2008 Report for three different treatment technology alternatives (Iron Coprecipitation, Nanofiltration, and Reverse Osmosis) deemed potentially

capable[1] of meeting proposed HHWQC. The 2008 Report costs have been updated to December 2010 dollars using the Engineering News Record Construction Cost Index and are presented in Table 1. Because the cost indices are similar between July 2008 and December 2010, costs presented in Table 1 are essentially the same as presented in the 2008 HDR Report.

The results of the technology evaluation from 2008 Report apply to this Addendum because some of the same key constituents (PCBs) would need to be removed to meet the same, restrictive HHWQC standards presented in the 2008 Report. Costs therefore are expected to be similar to those presented in the 2008 Report as presented in Table 1.

Table 1. Summary of Capital, O&M and Annualized Costs updated to December 2010 Dollars

Treatment Alternative		Mill A 27 mgd	Mill B 19 mgd	Mill C 11 mgd	Mill D 30 mgd
Capital Costs	Iron Coprecipitation	$31,000,000	$25,000,000	$19,000,000	$33,900,000
	Nanofiltration	$90,900,000	$66,900,000	$40,900,000	$100,800,000
	Reverse Osmosis	$106,800,000	$78,900,000	$47,900,000	$118,800,000
Annual O&M Cost	Iron Coprecipitation	$28,000,000	$20,000,000	$11,000,000	$31,000,000
	Nanofiltration	$9,500,000	$6,700,000	$3,900,000	$10,500,000
	Reverse Osmosis	$10,500,000	$7,400,000	$4,300,000	$11,700,000
Annualized Costs (10 yrs, 7%)	Iron Coprecipitation	$32,000,000	$24,000,000	$14,000,000	$35,900,000
	Nanofiltration	$22,000,000	$16,000,000	$10,000,000	$25,000,000
	Reverse Osmosis	$26,000,000	$19,000,000	$11,000,000	$29,000,000

POLLUTANT MINIMIZATION PLAN AND MONITORING

The proposed rule revisions include the addition of Pollutant Minimization Plans (PMP) as one of the requirements of obtaining a variance or other implementation measures that may be included in the final rules. The objective of a PMP is to implement, where possible, activities which could reduce the amount of pollutant reaching a water body[2]. NWPPA requested HDR address the potential impacts of this rule in terms of additional costs for engineering services, sampling/monitoring, and analytical testing associated with a PMP for addressing As, Cd, Hg, and PCB as a single mill. These impacts are summarized below.

The proposed rule indicates that the PMP for facilities, such as mills, that have small contributions and very limited opportunities to reduce pollutant loadings will not be an extensive document. However, PMP activities should be examined and discussed in the plan including source reduction and treatment/process optimization strategies. Source reduction activities to be evaluated include alternative sources for intake water, material substitution, watershed pollution prevention programs, pre-treatment local limits, and offsets/trading. Wastewater treatment and process optimization strategies include investigating wastewater collection piping inflow and infiltration interactions and optimization of treatment technologies.

[1] The ability to meet proposed HHWQC is uncertain and contingent upon further testing.

[2] *NPDES Permitting Tools for Human Health Toxics Rulemaking for June RWG Meeting* (ODEQ, July 8, 2010)

A PMP commonly includes the following contents[3].

1. Introduction
2. Background
3. Source Assessment
4. Source Evaluation
5. Pollution Prevention Measures
6. Monitoring Program
7. Reporting

The development of a PMP requires a review of the raw materials being used and the processes occurring at the facility. These are reviewed in the source assessment and evaluation sections. The pollution prevention measures section address ways to reduce pollutants introduced via the raw materials and/or the processes used to process the materials. The monitoring program section provides the general aspects of the monitoring such as an indication of where the samples will be collected, parameters to be tested, and when the monitoring will occur.

The detailed aspects of the monitoring need to be described in a Quality Assurance Project Plan (QAPP). The QAPP will include details such as the field procedures, the type of sample, e.g., grab, composite or other, the laboratory analytical Method, and QA/QC tests including replicates, duplicate, and spike samples. Additional details include how and where flow will be measured and if field parameters are measured such as water temperature and pH.

With so many variables, estimating the potential range of costs is difficult. A potential range of costs was based on PMPs developed for other mills and similar projects; however, costs presented in Table 2 could vary somewhat significantly from actual costs for each mill based on the magnitude of sampling and level of detail and complexity for each PMP and QAPP. These costs are considered order-of-magnitude with a confidence level of approximately plus 50-percent, minus 30-percent. Costs assume monthly sampling for 24 months at mill intake and discharge for As, Cd, Hg, and PCB. Costs also assume the PMP will address As, Cd, Hg, and PCB. A PMP addressing a single constituent would be less than the total of $99,000 shown in Table 2 but only marginally less due to the economies of scale in preparing a PMP for multiple constituents simultaneously.

Table 2. Potential Range of Baseline PMP Costs for a Single Mill

Activity	Labor Estimate	Expense Estimate	Subtotal
PMP	$35,000	$2,000	$37,000
QAPP	$25,000	$2,000	$27,000
Field Data Collection	$10,000	$10,000	$20,000
Laboratory Analytical Costs	Included in expenses	$15,000	$15,000
TOTAL	$70,000	$29,000	$99,000

[3] Technical Bulletin No. 902. *Material substitution to reduce mercury concentrations in pulp and paper industry final effluents*. (National Council for Air and Stream Improvement, August 2005).