Modernization of the *Pulp and Paper Effluent Regulations*

Detailed Proposal for Consultation

May 2019

Executive Summary

The 1992 *Pulp and Paper Effluent Regulations* (PPER) were put in place to streamline the existing 1971 regulations, improve the protection of fish and their habitat and widen their application to all mills. The environmental protection measures were developed using the performance of some Canadian mills in the late 1980s and what was achievable through secondary wastewater treatment at the time. Although portions of the PPER have been amended over the last 25 years, a complete review of their protection, implementation and compliance requirements has not been done.

The current modernization initiatives account for the following:

- Environmental effects monitoring (EEM) studies required by the PPER have shown that the effluents from 70% of pulp and paper mills are impacting fish and/or fish habitat, and that the impacts at 55% of these mills pose a high risk to the environment;
- The Canadian industry is diversifying the products made from wood and other plant materials to include non-traditional products such as nanocrystalline cellulose, lignin and hemicellulose;
- Canadian mills, in general, discharge effluents with higher suspended solids, biochemical and chemical oxygen demand and nutrients per tonne of production than competitors in Europe and United States;
- What is achievable through process control and wastewater treatment has improved since 1992 when the PPER were put in place, and best technologies and techniques are well documented.

ECCC is proposing to:

- Widen the scope of the PPER to capture facilities producing non-traditional products from wood, other plant material, pulp or a pulping process.
- Improve environmental protection by:
    - Lowering effluent limits for currently regulated substances; and
    - Adding effluent limits for additional substances, temperature and pH.
- Simplify administration of PPER by:
    - Improving the efficacy and efficiency of EEM requirements by:
        - streamlining EEM requirements to focus on the effects that are potentially of a higher risk to the environment;
        - reducing the time spent by regulatees on investigation studies;
        - requiring the implementation of solutions identified in EEM studies; and
        - including requirements for effluent characterization and water quality monitoring.
    - Clarifying the process and effluent limits for idled, closing and closed mills; and
    - Revising effluent limits for off-site landfills and expanding the scope to landfills owned by a third party.
- Modernize monitoring and reporting requirements by:
    - Incorporating a pH stabilization protocol to be used in conjunction with the existing test method for acute lethality

- Updating requirements for analytical methods; and
- Updating requirements for compliance monitoring and reporting.

Initial consultation on modernization proposals occurred during the fall of 2017. This paper accounts for feedback received since then, and presents more detailed proposals.

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1.0 Introduction

In September 2017, Environment and Climate Change Canada (ECCC) shared the consultation document entitled, *Proposed Modernization of the Pulp and Paper Effluent Regulations – Consultation Document*, with industry, environmental non-governmental organizations (ENGOs), Indigenous Peoples, provincial governments, and other interested parties.

This *Detailed Consultation Document* focuses on the changes ECCC is proposing and considers comments received on the four keys areas:

- Scope of Regulations
- Environmental Protection Measures
- Administrative Improvements
- Compliance and Administrative Requirements

Feedback is welcome on these key areas and any other areas of the PPER. Interested parties may submit feedback in writing (by mail or e-mail) or during information sessions organized by ECCC (see section 7.0 of this document for contact details).

2.0 Scope of Regulations

ECCC proposes to expand the scope of the PPER to include biotransformation. The proposed mill definition will ensure the scope of the PPER captures facilities engaged in the transformation of cellulose fibers, or the production of products from a pulping process or directly derived from pulp. The PPER are not expected to capture biofuels unless a pulping process is used to manufacture the biofuel.

A facility would be subject to the PPER if it meets the following definition

> **"mill" means** a facility that is used or designed to produce:
> (a) pulp from wood or from other plant material or paper products; or
> (b) any product made directly from pulp or a pulping process

A mill's effluent discharge limits for some deleterious substances are determined using a reference production rate (RPR) as defined by the PPER. This RPR is based on the mill's production of finished products also defined by the PPER. ECCC proposes to revise the definition of "finished product" to better capture products that are and are expected to be produced at facilities subject to the PPER. The proposed definition for a finished product is:

> **"Finished product" means** pulp, paper, cellulose-based and sugar-based products that has completed the production process at a mill.

3.0 Environmental Protection Measures

ECCC proposes to review intensity effluent factors for biochemical oxygen demand (BOD), suspended solids (SS), and add an intensity factor for chemical oxygen demand (COD). ECCC proposes to add effluent concentration limits for nitrogen and phosphorus and limits for temperature and pH.

To enable more precise determination of effluent limits to further improve environmental protection ECCC proposes to introduce definitions for the following mill categories:

- **Chemical mills**: mills that are designed to operate a recovery boiler, a lime kiln or a pulping digester
- **Mechanical mills**: mills that are not chemical or paper recycling and papermaking mills
- **Paper recycling and papermaking mills**: mills that are designed to produce pulp and/or paper products from pulp, paper or recycled paper.

Intensity Factors for BOD, SS and COD for Operating Mills

The following intensity (production-based) effluent factors are being considered for operating mills in the three process categories.

Proposed Intensity Factors for Operating Mills						
Mill Category	BOD kg/t		SS kg/t		COD kg/t	
	Daily	Monthly	Daily	Monthly	Daily	Monthly
Chemical	4.25	2.6	6.25	3.75	75	45
Mechanical	1.25	0.75	2.5	1.5	50	30
Paper Recycling Papermaking	1.25	0.75	2.5	1.5	12.5	7.5

The following intensity effluent factors currently apply for operating mills.

Current Intensity Factors for Operating Mills						
Mill Category	BOD kg/t		SS kg/t		COD kg/t	
	Daily	Monthly	Daily	Monthly	Daily	Monthly
All mills	12.5	7.5	18.75	11.25	None	None
Dissolving Grade sulphite (maximum allowances)	45	27	62.5	37.5	None	None

Loading limits apply per facility and are calculated using the following formulas based on intensity factor and reference production rate (RPR):

Daily maximum loading (kg) = daily intensity factor x RPR
Monthly maximum loading (kg) = monthly intensity factor x RPR x calendar days in the month

The loading limits for a complex made up of different types of facilities discharging into one wastewater treatment system would be calculated using the following formulas:

$$Daily\ Maximum\ Loading\ (kg) = \sum_{1}^{N\ facilities} (F \times RPR)_{facility\ 1} + (F \times RPR)_{facility\ 2} + \cdots + (F \times RPR)_{facility\ N}$$

$$Monthly\ Maximum\ Loading\ (kg) = \sum_{1}^{N\ facilities} (F \times d \times RPR)_{facility\ 1} + (F \times d \times RPR)_{facility\ 2} + \cdots + (F \times d \times RPR)_{facility\ N}$$

Where:

- *F* represents the facility's intensity factor
- *RPR* represents the facility's reference production rate,
- *d* represents the number of calendar days in the respective month, and
- *N facilities* represents the number of facilities that make up the complex.

Adjustment to RPR for Biotransforming Mills

Mills that may, in the future, produce new products made directly from pulp or a pulping process that are not defined as a "finished product" will be able to apply for an interim reference production rate. This would provide flexibility within the PPER to address new products and processes that may contribute to wastewater load by adjusting the mill's RPR and discharge limits to account for the production of these other products. The production of the other products would need to represent more than 25% of the total RPR and increase the organic loading to the wastewater treatment system by more than 25%. Mills applying for this interim RPR would need to be meeting the limits required by the modernized PPER, as well as demonstrate that the treatment process removes at least 60 % of COD and at least 90% of BOD. This interim RPR would be in place for one year.

Concentration-based Limits for Phosphorus and Nitrogen for Operating Mills

The following concentration-based effluent limits are being considered for operating mills. Currently, there are no limits for phosphorus and nitrogen.

Proposed Concentration-based Limits for Operating Mills				
Mill Category	Total Phosphorus mg/L		Total Nitrogen mg/L	
	Weekly Maximum Average	Monthly Maximum Average	Weekly Maximum Average	Monthly Maximum Average
All process categories	2.0	1.5	20	15

Temperature Limit

ECCC proposes to limit effluent temperature for all final effluents for all mills to a maximum daily temperature of 40 °C and a maximum monthly average temperature of 35 °C. Currently, there is no temperature limit.

pH Range Limit

ECCC proposes to limit final effluent pH to within a range that must be maintained. Currently, there is no pH range limit.

Proposed Effluent pH Range for Operating Mills	
Receiving Environment	pH Range for final effluent
Freshwater	6.0-9.5
Marine / estuary	6.5-9.2

4.0 Changes to the Administration of the PPER

ECCC is considering addressing several operational issues that have arisen during the course of administering the PPER. The following changes are being proposed.

Environmental Effects Monitoring (EEM) Requirements

Incorporation of Critical Effect Size

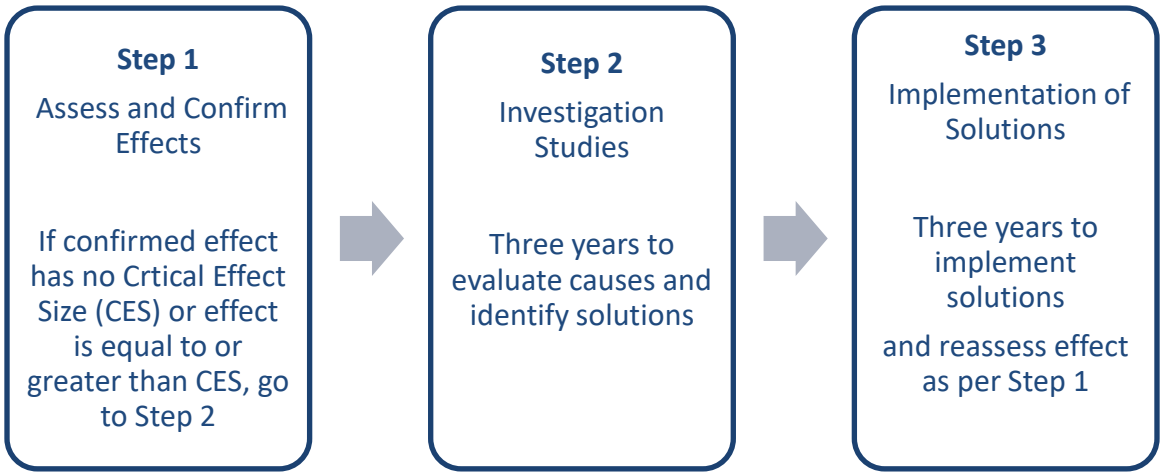
ECCC proposes to streamline EEM requirements to focus on the effects that are potentially of a higher risk to the environment by incorporating critical effect size (CES) as the threshold to trigger investigation studies on effects.

ECCC is proposing to introduce critical effect sizes for seven of eight effect indictor categories. When an effect indicator has a CES, an investigation of cause and solutions study would be required only if an effect on that indicator is equal to or greater than its CES. When all effects are less than CES, the frequency for conducting studies would be reduced. For effect indicators without a CES, an investigation study would be required.

Investigation Studies and Implementation of Solutions

ECCC proposes to allow one study period of 3 years to determine the cause of environmental effects of effluent and to identify solutions for those effects. Once this investigation study is complete and solutions are implemented, mills would be required to conduct a study to re-assess effects in the receiving environment and submit the results in the next 3-year study period.

ECCC is considering requiring, as a part of the EEM requirements, the implementation of solutions identified by mills. Once mills are subject to the proposed effluent limits, they would re-assess the impacts of effluent and investigate any remaining effects to determine cause and identify solutions to reduce or eliminate those effects. Mills would be required to implement identified solutions within a 3-year timeframe. After implementation, studies to re-assess effects would resume.



Effluent Characterization

ECCC proposes that mills characterize their final effluent. Effluent characterization would be required once per calendar quarter and not less than one month apart. Analytical requirements, including method detection limits, accuracy and precision will be defined in the regulations.

Effluent characterization would be conducted by analyzing a sample of effluent and recording the hardness, alkalinity, electrical conductivity and temperature of the sample and the concentrations of a list of substances. The list of substances is under development and could include:

- total organic carbon
- metals
- substances known to be discharged in pulp and paper effluents that may be of concern
- substances assessed through the Department's Chemical Management Plan that may be deemed toxic under the *Canadian Environmental Protection Act*

Water Quality Monitoring

ECCC proposes that mills be required to conduct water quality monitoring studies.

Water quality monitoring would be conducted:

- four times per calendar year at least one month apart in the exposure area of each effluent deposit and related reference areas, and
- when biological monitoring studies are conducted in the areas selected for the studies

Water quality monitoring would measure:

- effluent characterization parameters listed above

- deleterious substances set out in section 3.0, excluding BOD and COD
- water temperature
- depth
- dissolved oxygen concentration
- In the case of effluent deposited into freshwater: pH, hardness, electrical conductivity, and alkalinity
- In the case of effluent deposited into estuarine waters: pH, hardness, electrical conductivity, alkalinity and salinity
- In the case of effluent deposited into marine waters: salinity

Study Designs for Environmental Effects Monitoring

ECCC proposes to:

- Require all mills to submit study designs for biological monitoring and investigation studies
- Study designs for mills not conducting biological monitoring studies due to effluent dilution criteria would contain site characterization information, including an estimate of the concentration of effluent in water at 100 m from each effluent deposit. An interpretive report would not be required

Idled and Closing Mills and Off-site Landfills

New Provisions for Idled Mills

ECCC proposes to require the owner or operator of a mill to notify ECCC when the mill has stopped or is expected to stop production for 100 consecutive days or more. The mill would then enter idled mill status. Conditions for an idled mill would remain the same as an operating mill, with the exception of specific concentration-based limits for BOD, SS and COD (see table of Proposed Effluent Limits below).

Idled mill status would remain in place until the mill resumes production or notifies ECCC the mill intends to close and be subject to the closing mill process. If the mill resumes production, the owner or operator would have to apply for an interim reference production rate. The interim reference production rate would reflect the new capacity of the mill.

New Provisions for Closing and Closed Mills

ECCC proposes two phases for closing a mill.

Phase 1: Preparation for closure

- Requirement of owner or operator to notify ECCC when a mill intends to close
- Requirement of owner or operator to provide ECCC with closure plan that includes :
    1. identification of key pieces of equipment, feedstock and wood residues to be removed
    2. timeline for removal
    3. identification of high risk activities that may result in an unauthorized deposit
    4. procedures for preventing unauthorized deposits of deleterious substances
- Completion of a closure plan would be a condition governing the authority to deposit effluent

Phase 2: Closure of mill

- The mill will have "closed mill" status when the owner or operator has notified ECCC when the mill:
  - is no longer designed to be a mill, and
  - has removed key pieces of equipment
- Closed mill status remains in place for a period of 1 year
- Conditions for a closed mill would remain the same as an operating mill with the exception of the specific concentration-based limits for BOD, SS and COD listed in table below
- After one year of "closed mill" status, the facility would no longer be subject to the PPER and any effluent discharged would be subject to subsection 36(3) of the *Fisheries Act*

Requirements for Off-site Landfills

ECCC proposes to include specific concentration-based limits for BOD, SS and COD in effluents (leachate) generated by all off-site landfills. ECCC proposes to expand the scope of the PPER to regulate off-site landfills containing mill residues owned or operated by a third party whose purpose is to collect mill residues. Conditions and monitoring requirements for mills will apply to all off-site landfills with the exception of provisions relating to reference production rate.

Proposed Effluent Limits for Idled and Closed Mills and Off-site Landfills

The following concentration-based effluent limits are being considered for idle and closed mills and off-site landfills.

Proposed Effluent Limits for: Idled and Closed Mills and Off-site Landfills Containing Mill Residue							
Timeframe	BOD mg/L	SS mg/L	COD mg/L	Total Phosphorus mg/L	Total Nitrogen mg/L	Temperature °C	pH Range
Daily Maximum	50	50	300			40	6.0-9.5 freshwater 6.5-9.2 marine/estuaries
Weekly Maximum Average				2	20		
Monthly Maximum Average	30	30	180	1.5	15	35	

Clarification for Unauthorized Deposits

The PPER refers to "deposits out of the normal course of events". To reflect and align with the revised section 38 of *Fisheries Act*, this term will be revised to "unauthorized deposits of deleterious substances". The PPER set requirements on evaluating the impact of an unauthorized deposit, which includes sampling requirements. ECCC proposes to clarify the requirements to ensure sampling occurs at the place where the unauthorized deposit occurred.

Modernizing Authorizations to exceed limits or combine effluents

Currently, there are three types of authorizations that give the authority to exceed limits authorized under the PPER for specific considerations/cases.

Authorization to treat other sources

An authorization to exceed the maximum quantities of deleterious substances authorized can be sought by a mill that treats, in addition to its own effluent, waste water from other sources. ECCC proposes to remove this authorization as no mill has applied for this authorization.

Dissolving grade sulphite pulp

An authorization to exceed the maximum quantities of deleterious substances authorized can be sought by a mill producing dissolving grade sulphite pulp. ECCC proposes to remove this authorization as the proposed limits consider sulphite processes.

Authorization to combine effluents

ECCC proposes to add a requirement to re-apply for this authorization every 5 years. In addition to existing requirements, mills would have to take steps to reduce COD before the effluent is treated and provide a description of these steps. The mill would also have to demonstrate that the treatment process removes at least 60 % of COD.

Site-specific Requirements for Port Alberni Mill

ECCC proposes to lower and align the site-specific effluent loading limits for the Port Alberni mill with the limits proposed for all operating mills listed in section 3.

Given that ECCC is proposing to add dissolved oxygen as a part of water quality monitoring for EEM, ECCC proposes to repeal the specific requirement to measure dissolved oxygen for Port Alberni.

Proposed Effluent Limits for Port Alberni Mill							
Timeframe	BOD kg	SS kg	COD kg	Total Phosphorus mg/L	Total Nitrogen mg/L	Temperature °C	pH Range
Daily Maximum	1406	2813	56,250			40	6.5-9.2 marine/estuaries
Weekly Maximum				2	20		
Monthly Maximum Average	843	1688	33,750	1.5	15	35	

5.0 Compliance and Administrative Requirements

Non - Acute Lethality Requirements

ECCC is proposing to incorporate the pH stabilization protocol (RM 59) as an acceptable method to test for acute lethality, in conjunction with the existing required test method (RM 13). Mills can use RM13 alone or RM 13 with RM 59.

An effluent will be acutely lethal if either test is failed. If an effluent fails a test, subsequent testing will have to be done with the first elected testing method. If a mill tests the same effluents using RM13 and RM 13 with RM59, the results of the test using RM59 will be used to determine compliance.

Analytical Methods

ECCC proposes to update where appropriate and add to the required analytical methods. These changes will include:

- Revisions to reference information for existing required test methods
- Addition of reference information of new required test methods for COD and pH stabilization protocol
- Addition of precision and method detection limits

Effluent Monitoring and Testing Schedule

Below is a table with a proposed schedule for existing and new parameters or tests.

Parameter/test	Proposed change	Regular frequency	Reduced frequency	Increased frequency
BOD	Reduced frequency criteria no longer linked to SS Change in monitoring threshold for frequency reduction from monthly to quarterly	Three times a week	Monthly (If in the previous quarter each effluent sample contained BOD<10 mg/L or effluent is only non-contact cooling water)	nil
SS	Decrease regular monitoring from daily to 3 times a week Reduced frequency criteria no longer linked to BOD	Three times a week	Monthly (If in the previous quarter each effluent sample contained SS<10 mg/L or effluent is only non-contact cooling water)	nil

Parameter/test	Proposed change	Regular frequency	Reduced frequency	Increased frequency
	Change in monitoring threshold for frequency reduction from monthly to quarterly			
COD	New	Three times a week	Monthly (If in the previous quarter each effluent sample was not acutely lethal contained: COD<20 mg/L or effluent is only non-contact cooling water)	nil
Total Nitrogen	New	Weekly (Monthly for non-contact cooling water)	nil	nil
Total Phosphorus	New	Weekly (Monthly for non-contact cooling water)	nil	nil
Temperature	New	Continuous Monitoring- Report daily maximum		
pH	New	Continuous Monitoring- Report daily minimum and maximum		
Acute Lethality of Rainbow Trout	New option for reduction to quarterly monitoring	Monthly (At least 21 days apart) (Notify Minister of the Environment at least 30 days prior to sampling)	Quarterly (At least 45 days apart if effluent is determined not acutely lethal over a period of 12 consecutive months) Notify Minister of the Environment at least 30 days prior to reduction of frequency of sampling)	Weekly (if effluent is determined acutely lethal) (resume regular frequency if effluent is determined not acutely lethal in three consecutive tests)
Acute lethality of *Daphnia magna*	Added requirement of COD < 20 mg/L as a requirement for reduction Change in monitoring	Weekly	Monthly If in the previous quarter each effluent sample was not acutely lethal and contained: SS<10 mg/L, BOD < 10 mg/L, COD < 20 mg/L or effluent is only non-contact cooling water	nil

Parameter/test	Proposed change	Regular frequency	Reduced frequency	Increased frequency
	threshold for frequency reduction from monthly to quarterly			
Effluent Characterization	New	Once per calendar quarter, at least one month apart	Not required if no production for 8 or more months	nil
Water Quality Monitoring	New	Four times per calendar year, at least one month apart	Not required if no production for 8 or more months	nil
Sublethal Toxicity	No change	Twice a year	Not required if no production for 8 or more months	nil

Data Reporting Frequency

ECCC proposes that reporting of monitoring results and production information be submitted to the Minister of the Environment on a quarterly basis within 45 days after the end of the quarter. Mills will still have to notify without delay of any exceedance of the maximum daily/monthly limits, or any test results that indicate a failure or non-compliance with the Regulations.

Public Availability of Information

ECCC is proposing to make publically available and accessible information related to the deposit of deleterious substances, including concentrations in effluents and loading, acute lethality, volume of effluent deposited at all outfall structure, as well as EEM study results.

6.0 Next Steps

The key target dates for regulatory development are outlined below:

	Interested parties are welcome to provide feedback on the Proposed Approach for Regulating Pulp and Paper Mills Effluent (refer to the additional information below about providing feedback).
Target 2020	Proposed pulp and paper effluent regulations under the *Fisheries Act* published in *Canada Gazette* Part I for a 60-day comment period
Target 2021	Publication of the final version of the PPER in the *Canada Gazette* Part II

7.0 Providing Feedback

We would like to invite all interested parties to provide comments and feedback on the modernization of the *Pulp and Paper Effluent Regulations*. Please send your feedback in writing to:

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