

# Cost of Compliance for Revised Toxics Water Standards



DEQ Cost of Compliance Workshop  
Northwest Pulp and Paper Association

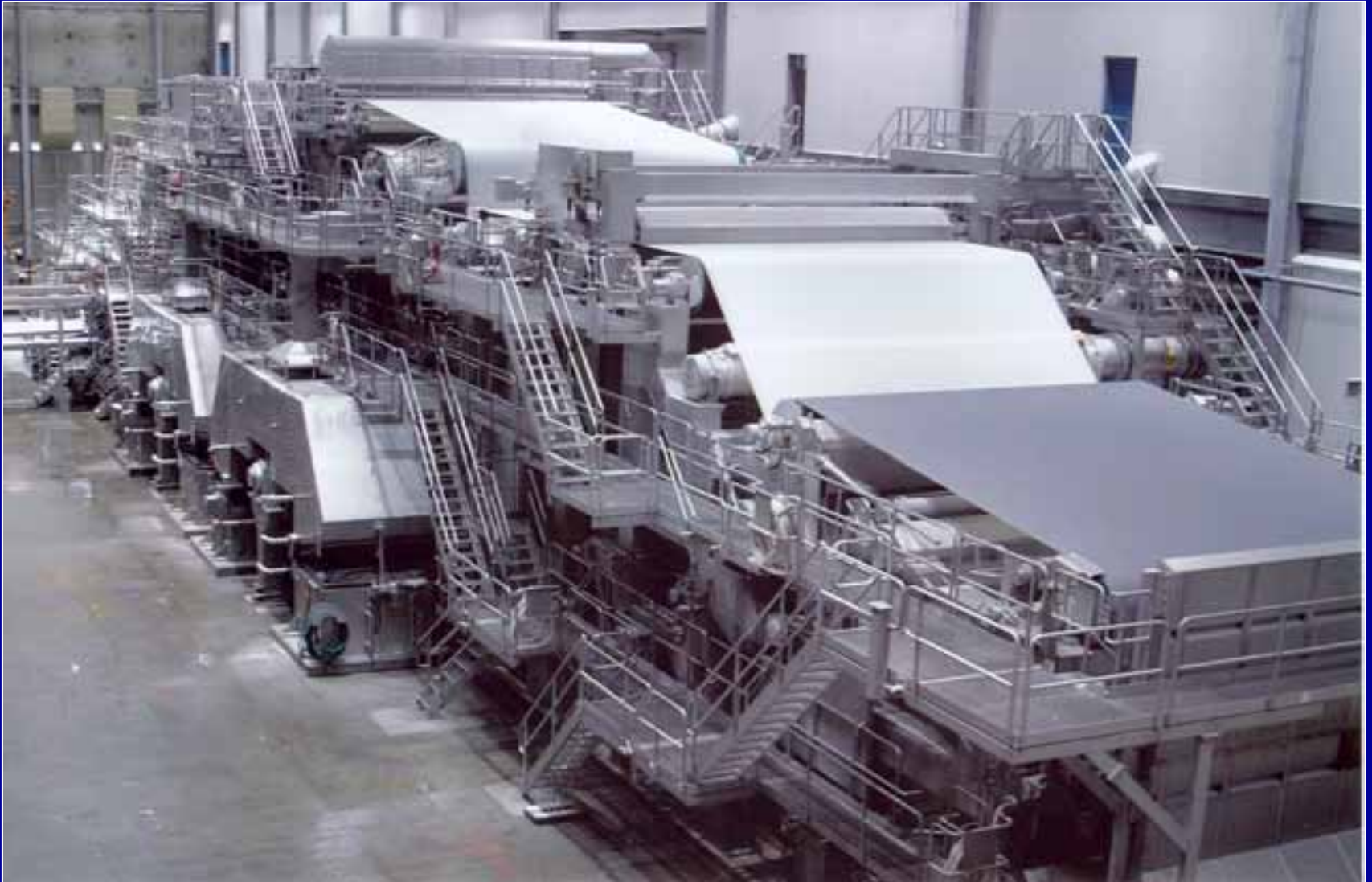
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# NWPPA Presentation

1. Who is NWPPA?
2. Report Background
3. Treatment Costs
4. Spokane TMDL Case Study
5. Risk Reduction in Fish
6. NWPPA Concerns



# The NW Pulp & Paper Assn.?



# Why NWPPA's Cost Study?

- NWPPA participates in public processes affecting our operations
- NWPPA members have previous experience with toxics water quality issues
- Pulp mill effluent has characteristics that make it challenging to treat (high organic matter from trees)
- Ability of treatment technologies to meet stringent water quality criteria not fully addressed by original SAIC report
- SAIC report did not adequately evaluate costs to meet new water quality criteria

# Water Criteria Translate into Water Permit Limits

- More stringent water quality criteria = reduced NPDES discharge limits in the current Oregon water permitting environment
- Compliance with permit limits 99.9% of the time is our goal
- No proven treatment to meet the human health water quality standard criteria under discussion.
- Costs will be prohibitive for available treatment technologies. Annualized costs may approach the actual value of the mills.

# NWPPA Concerns--SAIC Study

- NWPPA disputes the SAIC assumptions:
  - No technology requirements for non-measurable constituents
  - If no proven end-of-pipe technologies, dischargers will be eligible for variances
  - Cost estimates based on 10 year time frame
- NWPPA believes under current regulatory scenarios, more stringent standards will drive:
  - Numeric limits in permits
  - Expensive treatment technology
  - Huge legal risks for permit holders in an uncertain regulatory scenario - no ability to plan or expand
  - Competition issues with our global competitors

# NWPPA Study Assumptions

- OR DEQ spreadsheet used to calculate human health water quality criteria at elevated fish consumption rates - range of 63 - 389 g/day
- Study assumes technologies must meet new effluent limits -- even if new limits below detection limits
- Literature Review showed little evidence that ultra-low effluent limits are achievable with current technology
- 17.5 g/day was considered the baseline; however, most point sources do not have permits incorporating the current criteria

# NWPPA Report Methodology

- Human health water quality criteria calculation
- Literature review of treatment technology
- Treatment technology review and screening
- Cost Development

# NWPPA Treatment Options Studied

- Iron Coprecipitation
- Granular Activated Carbon
- Ion Exchange
- Nanofiltration
- Reverse Osmosis
- Each option has advantages and disadvantages.

# Iron Coprecipitation

## Advantage

1. Low capital cost
2. Conventional technology

## Disadvantage

1. High chemical costs
2. Large quantity of total dissolved solids added to effluent
3. High operating & maintenance costs

# Granular Activated Carbon

## Advantage

1. Moderate costs

## Disadvantage

1. Adds arsenic to effluent
2. Adsorbs organics
3. Filter blinding, making pretreatment necessary
4. Not commonly used for metal removal

# Ion Exchange

## Advantage

1. Moderate costs
2. Appears effective at removing individual metals

## Disadvantage

1. Difficult to remove multiple constituents
2. Non-regenerable resin
3. High disposal costs
4. Resin fouling/blinding, pretreatment necessary

# Nanofiltration

## Advantage

1. Moderate cost
2. Appears effective at removing metals

## Disadvantage

1. Filter blinding, pretreatment necessary
2. High capital costs -  
-significant quantity of concentrate to treat and/or dispose

# Reverse Osmosis

## Advantage

1. Most advanced method of treatment
2. Effectively removes all dissolved constituents

## Disadvantage

1. Significantly high capital cost
2. Significant quantity of concentrate to treat/dispose
3. Nonselective, removal all dissolved ions
4. Pretreatment required
5. High operating and energy costs

# Summary of Capital Costs: One Mid-sized OR Mill

	Capital Costs
Iron Coprecipitation	\$ 25 Million
Nanofiltration	\$ 67 Million
Reverse Osmosis	\$ 79 Million

# Summary of O&M Costs: One Mid-Sized OR Mill

	Annual Operating & Maintenance Costs
Iron Coprecipitation	\$ 20 Million
Nanofiltration	\$ 6.7 Million
Reverse Osmosis	\$ 7.4 Million

# Summary of Annualized Costs: One Mid-sized OR Mill

	Annualized Costs (10 years at 7%)
Iron Coprecipitation	\$ 24 Million
Nanofiltration	\$ 16 Million
Reverse Osmosis	\$ 19 Million

# P&P Compliance Issues: Reality, Pilots and Lawsuits



- These types of treatments are meant for small highly concentrated waste streams not typically used in our industry
- Additional costs are in engineering design, pilot testing, agency permitting, modeling and start up
- Uncertain whether technology can deliver compliance 99.9% of the time (compliance issues)

# Spokane TMDL Case Study

## Reality of NW Permit Scenario

- Washington's Spokane River Phosphorus TMDL is under development.
- Numeric limits in permits are below technology's ability to treat wastewater.
- EPA required numeric permit limits for point sources.
- NWPPA concern remains agency ability to employ available implementation measures.
- Ecology will allow offsets for non-bioavailable phosphorus.

QuickTime™ and a  
TIFF (Uncompressed) decompressor  
are needed to see this picture.

# What About Reducing Risks from Eating Fish?

- NWPPA believes that if human health is the concern -- the solution should target and reduce chemicals that pose a human health risk via fish consumption
- We suggest that risk from salmon is not being driven by current NPDES discharges from point sources, but rather constituents of concern are:
  - Naturally occurring earth metals
  - Banned organics substances like PCBs
  - Banned pesticide

# Constituents of Concern

- Surveys

- NWPPA Survey of Dioxin in Fish Tissue (1991)
- Bi-State (1995)
- EPA CR Basin Fish Contaminant Survey (1996-8)
- Willamette River Surveys and Portland Harbor

- Virtually identical outcomes

“Most frequently detected chemicals in fish tissue were 14 metals, DDT and its structural analogs (DDD, DDE), chlordane and related compounds (cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, and oxychlordane), PCBs (arochlors and dioxin-like PCBs) and dioxins and furans” EPA (1996-8) EPA 910-12-02-006 (p. E-3)

# Details on Specific Risk Drivers

- Mercury

- Atmospheric deposition of mercury is an important controlling factor in fish tissue mercury in the west. Rationale: fish tissue mercury occurs in a narrow range but geologic sources occur in a an order of magnitude of 2-3 times.
- Atmospheric modeling has shown Asian long-range transport. *EPA/OSU Environmental Science and Technology, Vol. 41, No 1 (2007)*
- Willamette TMDL work shows point sources to be *de minimus*

# Details on Specific Risk Drivers

- Arsenic

- Known carcinogen, but toxicity is in question. Majority found in fish tissue is organic arsenic which is thought to be less toxic than inorganic.
- Portland Harbor work includes reference site data which could be useful in determining background levels, which are thought to be relatively high
- Bi-State work found <1% loading to Lower Columbia River is from point sources and both arsenic and mercury are highly associated with sediment loads. *Draft Identification of Sources of Pollutants to LCR Basin (1996)*

# Alternative Approaches

NWPPA does not support an order of magnitude or greater increase in the current 17.5 g/day-based criteria; rather we support exploring effective alternatives that will also mitigate prohibitive treatment/regulatory and legal costs:

1. Only raising fish consumption factor for chemicals driving risk in fish tissue
2. Allowing phased implementation so that first round of NPDES permits would use standards as benchmarks for compliance purposes
3. Use of narrative standards and *de minimus* provisions
4. Pass-through credits for naturally occurring compounds

# NWPPA Ongoing Concerns

- 60% of proposed standards at 175 g/day are below scientific measurement limits (Source: DEQ 2008)
- Proposed standards exceed capability of commonly used treatment technology
- Prohibitive end-of-pipe treatment costs
- Negative economic effects on Oregon's economy
- Whether implementation of revised WQS criteria in revised NPDES permits will produce a meaningful reduction of risk associated with fish consumption
- Fair implementation across business sectors
- Reliable and sustainable compliance using advanced treatment technology uncertain and extremely costly

# Wrap Up and Questions

Thank you!

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