BRITISH COLUMBIA

Ministry of Transportation and Infrastructure

Ministry of Forests, Lands and Natural Resource Operations

Guidelines for Use of Treated Wood In and Around Aquatic Environments and Disposal of Treated Wood

1.0 SCOPE

This document is to provide information on mitigating or minimizing potential impacts of treated wood used in new structures in and around aquatic environments. This document does not provide guidance on the engineering requirements of structures using treated wood.

1.1 BACKGROUND

Wood is a renewable resource and can be a cost effective option for structures. The Province of British Columbia has committed to stimulate the forest industry with the Wood First Act, which requires wood to be considered as a primary component in all public buildings. The BC Ministry of Transportation and Infrastructure (MOTI) and Ministry of Forests, Lands and Natural Resource Operations (FLNR) are following in the spirit of the Wood First Act by encouraging the use of treated wood on bridges where appropriate. For applications exposed to soil, rain, or water, wood should be treated with preservatives to protect it from decay, which will conserve and prolong the service life of the wood.

1.2 REGULATORY FRAMEWORK

Pest Management Regulatory Agency

In Canada, the Pest Management Regulatory Agency (PMRA) under Health Canada and in the United States, and the Environmental Protection Agency (EPA), have regulatory authority over the use of wood preservatives and treated wood. Jointly, these agencies regularly conduct a thorough review of the environmental impacts of treated wood. Each of the wood preservatives discussed in these guidelines are currently registered by PMRA. Labels which describe the accepted uses of products are available on the PMRA web site at www.hc-sc.gc.ca/cps-spc/pest/index-eng.php.

While a wood preservative may be registered as an approved product by PMRA, it is the responsibility of the proponent to ensure that use of the treated wood will not cause the release of a deleterious substance as defined under subsection 36(3) of the Fisheries Act (laws-lois.justice.gc.ca/eng/acts/F-14/).

Environment Canada

A 1985 Memorandum of Understanding (MOU) between Fisheries and Oceans Canada (DFO) and Environment Canada (EC) states that EC is responsible for the administration and enforcement of the pollution prevention provisions of the federal Fisheries Act. Subsection 34(1) of the Fisheries Act defines a "deleterious substance" as any substance that degrades the quality of water so that it is deleterious to fish or fish habitat. Subsection 36(3) prohibits the deposit of a deleterious substance of any type in water frequented by fish. In some cases, the pesticides found in treated wood are considered to be a deleterious substance, should the preservatives leach into an area deemed to be fish habitat.

EC does not provide authorizations or permits relating to either the use of treated wood products, or for the deposition of acceptable levels of wood preservatives released in sensitive environments. Also, EC does not endorse or certify commercial products, including wood preservatives.

Fisheries and Oceans Canada

DFO is responsible for enforcement of all sections of the Fisheries Act, however, Environment Canada currently administers and enforces the pollution prevention provisions of the Fisheries Act per the aforementioned 1985 MOU. DFO administers the footprint impacts of works that occur in and about fish habitat, through subsection 35(1) which prohibits unauthorized works that cause the harmful alteration, disruption, or destruction of fish habitat. DFO administers and enforces subsection 36(3) in regards to the release of sediment and other deleterious substances that are not considered chemical pollutants.

2.0 PROCEDURE AND GUIDELINES:

2.1 PRESERVATIVE SELECTION AND RISK ASSESSMENTS

- The selection and use of treated wood is the responsibility of the proponent. Regulatory agencies such as DFO, EC, or the BC Ministry of Environment will not provide advice on use of treated wood. However, the agencies are responsible for enforcement of their respective regulations relating to environmental impacts.
- When using treated wood in or near aquatic habitats, the type of preservative used should conform to PMRA product labels for the intended application. Preservative selection will vary depending on the use, location, frequency of human contact, and the availability of a specific treatment (Table 1).
- Research over the last two decades on preservative loss rates from wood structures has led to the development of the most recent risk assessment models (2010). The risk assessment models discussed below should be required only under certain conditions where treated wood will be immersed in water (Table 2). Treated wood used in components above the mean high water line pose little risk of impact on aquatic life when following preservative treatment and construction best practices, and in most circumstances will not require a risk assessment.
- Other conditions which may necessitate the performance of risk assessments (in addition to conditions listed in Table 2) would be projects that would use greater than 100 pilings within the wetted perimeter in total, or are located in areas that may have high background levels of chemicals used in the preservative being considered (e.g. industrial areas, or areas that already have existing treated timber piles exceeding the Table 2 limits).

TABLE 1:
Choosing an appropriate preservative in and near an aquatic environment.

	Outside the wetted perimeter[3]		Inside the wetted perimeter[3]
	Handrails	No Frequent Skin Contact	Freshwater / Saltwater Immersion
Creosote	No	Yes	Yes[1]
Penta	No	Yes	No
CCA[2]	Yes	Yes	Yes[1]
ACZA	Yes	Yes	Yes[1]
ACQ and CA	Yes	Yes	No

Penta: Pentachlorophenol; CCA: Chromated Copper Arsenate; ACZA: Ammoniacal Copper Zinc Arsenate; ACQ: Alkaline Copper Quat; CA: Copper Azole

Where "Yes," this type of preservative can be used in this environment.

Where "No," this type of preservative should not be used in this environment.

1 In the event treated wood will be immersed in water, consult Table 2 to determine, based on site conditions, whether a risk assessment or alternative materials will be required.

2 CCA does not penetrate Douglas fir well and therefore it is very difficult to achieve the penetration and retention requirements of CAN/CSA-O80 for this preservative/species combination. Alternative wood chemicals or enhanced treatment processes should be considered. For FLNR projects, a prescriptive specification for treating Douglas fir with CCA that will give results that come close to achieving compliance with CAN/CSA-O80 requirements is available at: www.for.gov.bc.ca/hth/engineering/Std_Br_Material_Templates.htm

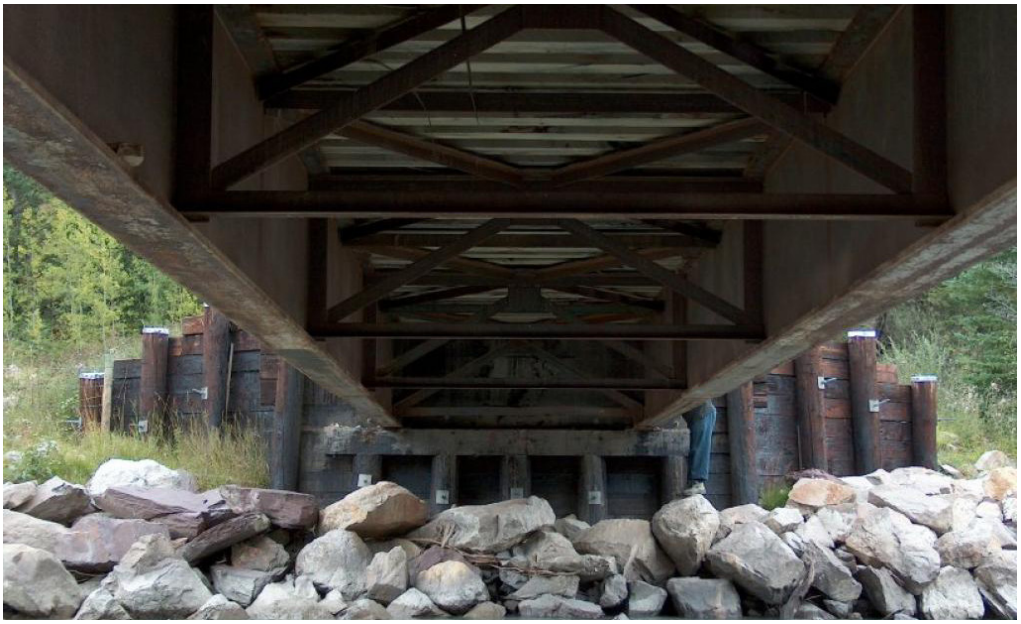
3 "Wetted Perimeter" is the area of stream channel extending to the normal high water marks, which is evident in the field as the boundary on the stream bank between the scoured channel and the edge of rooted vegetation.

TABLE 2:
Recommended conditions where risk assessments should be conducted when treated wood will be immersed in water (Western Wood Preservers Institute, 2006).

	Freshwater OR Saltwater Immersion				
	No. of pilings	AND/OR	Current Speed	AND/OR	Other
Creosote	> 4 per bent	AND	≤ 3.0 cm/sec	AND	Black Sediment or hydrogen sulphide smell when substrate is disturbed

	Saltwater Immersion			Freshwater Immersion				
	No. of pilings	AND/OR	Current Speed	Current Speed	AND/OR	No. of pilings	AND/OR	Other
CCA	> 4 per bent	OR	≤ 1.5 cm/sec	≤ 1.0 cm/sec	OR	> 100 total	AND	pH of receiving water < 5.5
ACZA	> 2 per bent	OR	≤ 1.5 cm/sec	≤ 1.0 cm/sec	OR	> 25 total	AND	

CCA: Chromated Copper Arsenate; ACZA: Ammoniacal Copper Zinc Arsenate



- A risk assessment may require a site visit by an Appropriately Qualified Professional to verify sediment and water qualities, stream flow, background chemical concentrations, and other ambient conditions. For small projects, it is estimated it will take 1-2 days to perform field work, and run models with project and site information to calculate risk.
- "Appropriately Qualified Professional" refers to an applied scientist or technologist specializing in a relevant applied science or technology including, but not necessarily limited to, agrology, forestry, biology, engineering, geomorphology, geology, hydrology, hydrogeology, or landscape architecture. An appropriately qualified professional must be recognized in British Columbia with the appropriate professional organization, and acting under that association's Code of Ethics and subject to disciplinary action by that association. He or she must also be someone who, through demonstrated suitable education, experience, accreditation, and knowledge relevant to the particular matter, may be reasonably relied on to provide advice within his or her area of expertise.
- Risk assessment models are available on the Western Wood Preservers Institute website at: www.wwpinstitute.org/documents/GeneralRiskAssessmentModelAquaticGuide4.10.xls (Excel File)
- The BC Ministry of Environment produces water quality guidelines and working water quality guidelines for British Columbia that describe allowable thresholds for the chemicals in soil and water. These guidelines are available on the internet at: www.env.gov.bc.ca/wat/wq/wq_guidelines.html.
- Please see Appendix 1: Decision Matrix for Use of Treated Wood In and Around Aquatic Environments, and Appendix 2: Water and Sediment Quality Sampling for further information.

2.2 TREATMENT STANDARD

The timber treatment industry has developed Best Management Practices (BMPs) to be used during the wood treatment process that places enough preservative chemicals in treated wood products to provide protection from decay while also reducing the amount of preservative that can potentially enter the environment. Continued improvement to the standards of applying preservatives to treated wood in recent years has greatly reduced the potential for impacts on the environment.

Treated wood used in structures should be specified to be produced in accordance with the requirements set out in Best Management Practices for the Use of Wood in Aquatic and Other Sensitive Environments (2006 or most current version) published by Western Wood Preservers Institute et al. which is available online at: www.wwpinstitute.org/documents/BMP_Revise_4.3.12.pdf.

Ensuring that treated wood has been produced using BMPs requires an independent third party inspection by an accredited agency, and certification documentation by either a BMP mark or letter from the third party inspection agency that certifies inspection and compliance. Treated wood specifications should state that the treatment plant is responsible for providing the third party certification of BMPs.

Wood should be treated in conformance with the appropriate specifications outlined by the proponent. For example:

- As described in MOTI Standard Specifications for Highway Construction SS908, treated wood must also be treated in conformance with the most recent edition of Canadian Standards Association standard CAN/CSA-080. SS908 also calls for third party inspection to confirm compliance with the CAN/CSA-080 standard.
- As provided for in FLNRO standards:
  - Interim Process Specification for CCA Treatment of Coastal Douglas-fir Wood. Which provides a process based specification for CCA treatment of Coastal Douglas fir, following best management practices and requiring third party inspection.
  - Bridge Timber and Lumber Material Standard. Which stipulates timber species, timber grading requirements, acceptable treatment options, and standards for wood bridge components.

These standards can be found at: www.for.gov.bc.ca/hth/engineering/Std_Br_Material_Templates.htm

2.3 DESIGN AND CONSTRUCTION

Effort should be made to minimize the exposure of treated wood to sunlight (reduces viscosity of oilbornes) and rainfall in the design of the timber structure to prevent runoff into aquatic environments.

MOTI's Environmental Best Practices for Highway Maintenance Activities (2010) contains information on construction and disposal best practices under Section 5.18, Installation and Use of Treated Wood in and Around Aquatic and Sensitive Environments. The document is available online at: www.th.gov.bc.ca/publications/eng_publications/environment/bestpractice.htm.

2.4 DISPOSAL AND REPLACEMENT

Treated wood has a finite lifespan, especially in areas susceptible to attack by insects and other wood borers. Deterioration and weathering can necessitate the replacement of treated timbers with newer components. Removal and disposal of treated wood components from existing structures should be done in a manner that reduces impact on the environment by following construction best practices. If treated wood pilings require removal, it should be done in a manner that minimizes disturbance of the substrate and contaminated sediments.

Landfilling at facilities approved to accept treated wood waste is the primary option for disposal within British Columbia. Outside BC and in the US, industrial boiler and co-generation facilities can recycle creosote or penta treated wood for use as energy.

Never burn treated wood in an uncontrolled environment, as the pesticides and ash it produces are toxic, containing chemicals such as arsenic, dioxins, or various carcinogenic polycyclic hydrocarbons.

3.0 REFERENCES

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4.0 ACKNOWLEDGEMENTS

These guidelines and best practices on the environmental impacts of treated wood have been jointly developed by MOTI and FLNR in conjunction with regulatory agencies and leading experts, to attempt to mitigate possible detrimental environmental effects related to the use of treated timber.

Dr. Kenneth Brooks, Owner, Aquatic Environmental Sciences, provided information on risk assessments and the acceptable use of treated wood and reviewed draft documents.

Mr. Ted LaDoux, Executive Director, Western Wood Preservers Institute, provided information on risk assessment procedures.

Dr. Paul Morris, Group Leader, Durability and Protection, FPInnovations/Forintek, provided extensive assistance and technical feedback with the development of these documents.

Mr. Adam Silverstein, Pacific Region Manager, and Steve Gotch, Team Leader, Habitat Protection and Sustainable Development, DFO, provided review to draft documents and information on the regulatory framework of treated wood.

Mr. Stan Liu, Head, and Mr. Jim Sheehan, Compliance Promotion Scientist, Chemicals Sector & Compliance Promotion Unit of Environment Canada, provided a great deal of information on treated wood and outlined Environment Canada's responsibilities in regards to treated wood.

Mr. Ian Redan, Environmental Technician, MOTI, lead document researcher and writer.

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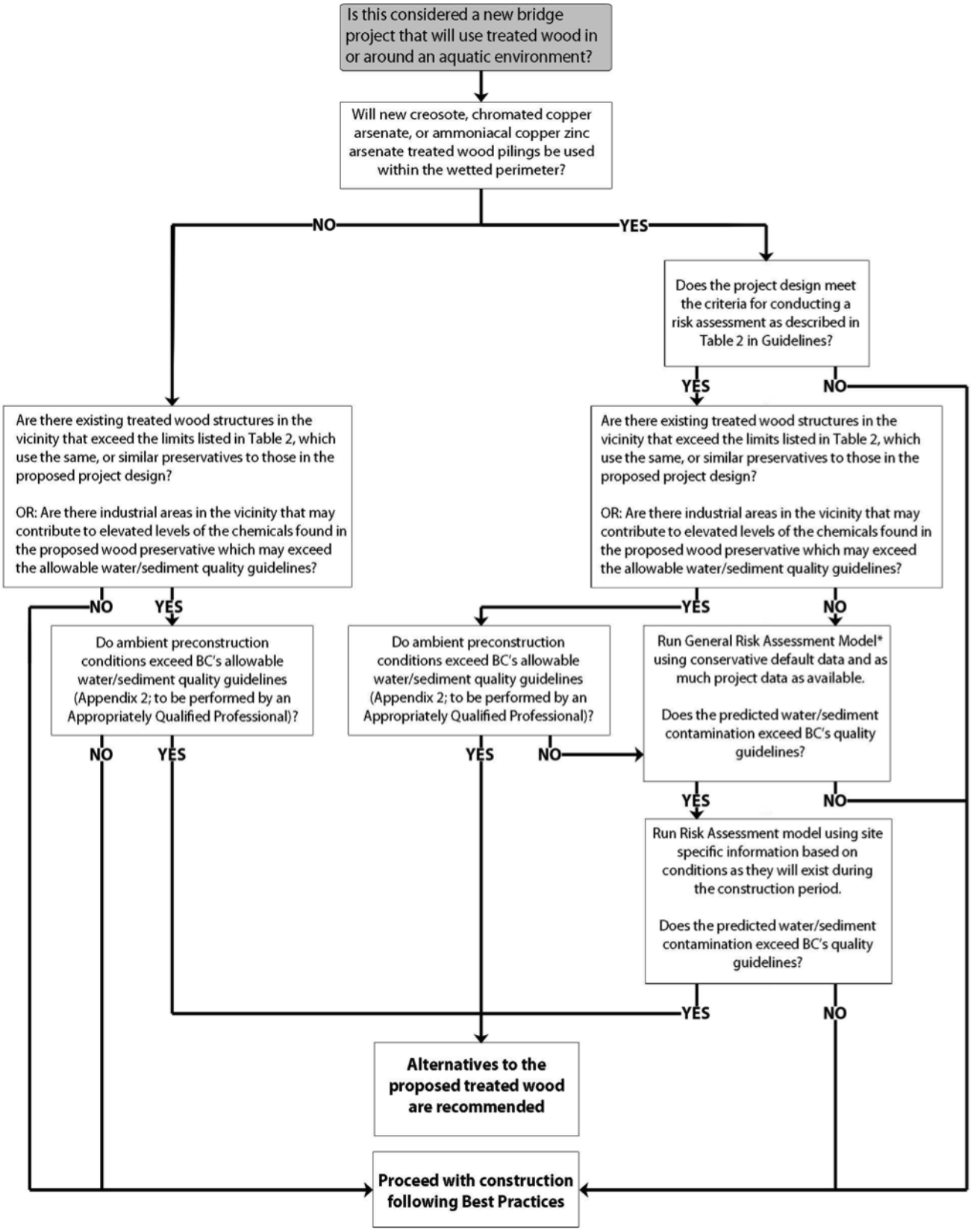
APPENDIX 1: DECISION MATRIX FOR USE OF TREATED WOOD IN AND AROUND AQUATIC ENVIRONMENTS



APPENDIX 2: WATER AND SEDIMENT QUALITY SAMPLING

Water and sediment quality sampling are only required if there is reason to believe there is significant existing contamination within the project area. If water and sediment analysis are required, conduct analysis appropriate to the proposed preservative (e.g. if the proposed preservative is creosote, sediments should be analyzed for polycyclic aromatic hydrocarbons (PAHs)). If CCA is proposed, water and sediments should be analyzed for the appropriate metals.

Resources Information Standards Committee procedures and guidelines on water and sediment sampling and interpretation are available at: www.ilmb.gov.bc.ca/risc/pubs/aquatic/index.htm.

Triplicate 100mL water samples collected at mid-depth in properly cleaned glass bottles are sufficient for freshwater projects. Triplicate 500mL samples for seawater analyses are recommended. Water samples should be filtered at 0.045µm prior to analysis.

Triplicate 100mL/250g sediment samples from upper 2.0cm within two metres downstream of existing pilings are sufficient to conduct analyses of biologically available contaminants. Sediments should be stored at 4°C until analyzed within two weeks, or frozen with a holding time of six months.

The BC Ministry of Environment produces approved, draft and working water quality guidelines for British Columbia that describe allowable guidelines for parameters in soil and water. These guidelines are available at: www.env.gov.bc.ca/wat/wq/wq_guidelines.html. Refer also to Canadian Council of Ministers of the Environment guidelines for further information: ceqg-rcqe.ccme.ca/.

***General Risk Assessment Model**

www.wwpinstitute.org/documents/GeneralRiskAssessmentModelAquaticGuide4.10.xls (Excel File)

The Risk Assessment model conservatively predicts environmental risk and:

- Specifies the preservative being used in Cell K1 (e.g. CCA-C=1, ACZA=2M or 2F for saltwater or freshwater, respectively, Creosote=10)
- Uses the current velocity values listed in Table 1 of this document for the wood preservative being used, e.g. for creosote, in Cell E32 for the variable "15. Steady State Current Speed or Vss (cm/sec)," type 3.
- Uses an estimation of the current velocities, if available, during the construction period instead.
- Inputs as much project information (e.g. surface area of wood, retention rate, stream dimensions) and real-world data as is readily available. Surface areas of Pilings and Immersed Lumber may be calculated through the Excel spreadsheet under the appropriate boxes, or calculated manually and input into Cell K66, under Table 9.
- Leaves other variables as defaults.