THE MANAGEMENT OF POST-USE TREATED WOOD

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1. Introduction

The Canadian Council of Ministers of the Environment (CCME) is the major intergovernmental forum in Canada for discussion and joint action on environmental issues of national and international concern. The work of the CCME is carried out by task groups established under the direction of two steering committees: the Strategic Planning Committee and the Environmental Protection Committee (EPC).

The CCME has identified the management of preservative treated wood products, following their removal from service, as a matter of national priority. The CCME assigned responsibility for this matter to the Hazardous Waste Task Group (HWTG), a subcommittee of the EPC.

As a result, Carroll-Hatch (International) Ltd. (CHI) was selected to develop the information required for the development of a Code of Practice for the management of post-use treated wood to allow the HWTG to deal with the issue in a national context. The study was carried out by CHI in collaboration with Frido Consulting of Notre-Dame Île Perrot, Quebec.

The study was conducted in accordance with the Terms of Reference of CCME Contract No. 934-HWTG-021 and the instruction and guidance of the Project Authority, Mr. H. Vogt, P.Eng., Manager, Technical Services and Special Waste, B.C. Environment.

2. Background

Wood is a preferred construction material due to its availability, structural properties, ease of manufacture and relatively low cost. However, wood suffers biological degradation in exposed applications due to attack by fungi, insects, bacteria and marine organisms. The wood preserving industry provides a solution to this problem by using special process technology to impregnate wood products with a variety of preservative chemicals which retard biological degradation. The use of these preservatives increases the service life of wood products by five to ten times.

However, at some point, treated wood products must be removed from service due to biological degradation, mechanical damage or obsolescence. These products still contain significant quantities of preservative chemicals, despite the fact they may have been in service for periods of 40 years or more. The proper management of these products, following removal, is now an important issue due to increased public and government concern about the potential effects of pesticides on public health and the environment. Therefore, it is necessary to consider a Code of Practice to ensure the safe management of the volumes of treated wood products that will be removed from service in the future.

3. Industry Profile

In 1993, a comprehensive survey of the wood preserving industry, established there were 60 plants operating in Canada. These plants produced approximately 70 million ft^3 of wood products treated with a variety of oilborne and waterborne chemicals. The oilborne wood preservatives included creosote, pentachlorophenol (PCP) and copper naphthenate while the waterborne formulations were chromated copper arsenate (CCA) and ammoniacal copper arsenate (ACA). Over 90% of production was consumed in Canada with the principal export being poles, together with smaller volumes of consumer lumber, posts and industrial timbers.

Canadian consumption of treated wood was approximately 66 million ft^3 in 1992, with the principal import being railway ties with smaller volumes of poles, industrial timbers and consumer lumber.

The Canadian market for treated wood products consists of an industrial sector (45%) which uses both oilborne and waterborne preservatives and a residential sector (55%) which depends entirely upon the use of CCA. In the industrial market, major users such as utilities, railways, the construction industry and highways, parks and public works authorities, consume approximately 30 million ft^3 of poles, lumber, timbers, ties, piling and posts. In the residential market, Canadian homeowners and building and landscaping contractors consume approximately 36 million ft^3 of lumber and plywood products. As a result of market development activities, the major trend over the past 20 years has been the significant growth in the residential market for treated lumber. This growth has more than offset a decline in the industrial market for products such as poles, ties and piling.

The overall consumption of treated wood in Canada has grown at an average compound rate of 4-5% per year over the last 20 years. The future market trend will be continuing overall growth in the use of treated wood in Canada. This growth will be almost entirely in CCA-treated consumer lumber for the residential market. In addition, for a variety of reasons, CCA will continue to capture a larger share of the industrial market. It is forecast that Canadian treated wood consumption will grow from the current level of 66 million ft^3 to 94 million ft^3 over the next 20 years, an increase of 43%.

This growth, projected at a compound rate of 1.6% per year, is approximately one third of the rate of growth for the last 20 years.

4. Treated Wood Removal Profile

Based on an analysis of past and future consumption and the service life of various products, it is estimated that over the next 20 years the average annual volume of treated wood removal will grow from 17.5 million ft^3 in the 1995-1999 period to 79.6 million ft^3 per year in the 2010-2014 period. The average annual volume of waterborne preservative treated removals will grow from 7.9 million ft^3 to 70.8 million ft^3 , while oilborne preservative treated removals will decrease from 9.6 million ft^3 to 8.8 million ft^3 . The profile of treated wood removal for the next 20 years is shown in Figure 1.

After allowing for growing consumption and removal, it is estimated that the installed volume of treated wood in Canada will increase from 1.13 billion ft^3 in 1995 to 1.95 billion ft^3 in 2015. This represents a total increase of 72% over the next 20 years.

5. Management Options

Current management practices for post-use treated wood in Canada and other countries are influenced by varying levels of regulations, environmental and health concerns, disposal economics and growing resistance to such traditional methods as open burning and landfilling. For industrial products, such as ties, poles and piling, the trend is to both increase their reuse and also develop technology for the recovery of value from their wood, chemical and energy components.

In the context of the accepted hierarchy of waste management strategies, there are a number of potential options for the management of post-use treated wood.

Abatement or elimination options include improved structural design to minimize the use of treated wood, the use of the least amount of preservative, the use of less toxic chemicals and the use of alternative construction materials. Reduction options include improved manufacturing processes, and other technological innovations, aimed at extending the service life of treated wood. These options will reduce consumption and ultimately the volume of product removal.

Reuse options include reuse for the original application, reuse for a less stringent form of the original application, use of the same product for a different application or remanufacture of the product into different products for different applications. Reuse options require careful attention to product inspection and quality control. The economics of reuse will be affected by collection, transportation and higher manufacturing costs.

Recycling options for treated wood include different approaches to the manufacture of reconstituted products using moulding or panelboard technology. The commercial development of moulded product technology has so far been unsuccessful, for a variety of technical and economic reasons. The use of recycled CCA-treated wood for the manufacture of wood-cement composite boards results in a superior product and should be investigated further. This fact will be of increasing importance since it is forecast that the use of inorganic preservatives will increase significantly in relation to the use of organic preservatives.

The recycling of the fibre and preservative components of treated wood, following their separation, is receiving a great deal of attention. The commercial development of new technology for recycling the components of PCP-treated poles is currently underway in Alberta. This process results in the reuse of clean poles and recovered preservative. Other methods, involving combinations of physical, chemical and microbiological technologies, are currently under development or investigation.

Controlled burning with energy recovery is considered by many to be the most economic and environmentally acceptable method of dealing with treated wood. The burning of wood containing organic preservatives in cogenerating plants and industrial boilers has been practised for some years. There is growing interest in the use of cement kilns for the disposal of both organic and inorganic preservative treated wood.

Controlled incineration, without energy recovery, appears to be the major destruction option, while disposal via landfill is the least desirable of all options in the waste management hierarchy.

6. Conclusions

The following conclusions should be considered in the development of a Code of Practice for the management of post-use treated wood:

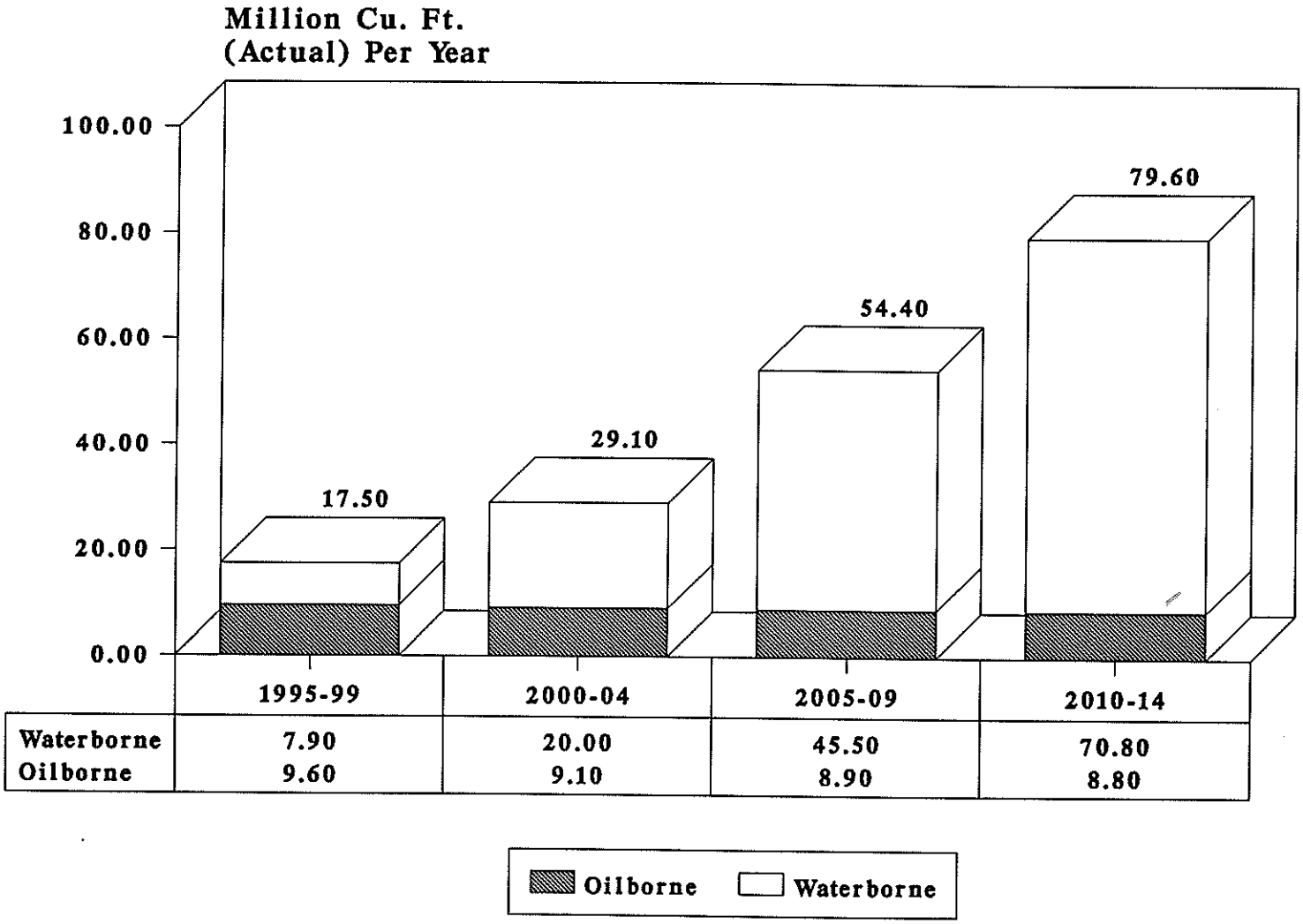
- Total removal volume will increase based on the growing demand for treated wood.
- CCA-treated removals will exceed oilborne-treated removals in 5-10 years.
- Abatement, elimination and reduction options are difficult to implement.
- Reuse options are difficult to manage and costly to implement.
- Recycling options, particularly for CCA-treated wood, require further development.
- Destruction and disposal options should be the last resort.
- Reported estimates of the cost of treated wood disposal are limited and do not allow specific conclusions to be developed at this stage.
- The bulk of post-use treated wood has the potential to be used as a secondary raw material rather than being sent for final disposal.
- Further assessment of management options is required to determine their technical and economic feasibility and their social, environmental and health impacts.

7. Recommendations

The Code of Practice for the management of post-use treated wood should be based on the following guidelines:

- Minimize post-use material volumes via options which optimize the use and extend the life of treated wood products.
- Maximize the recovery of post-use treated wood products and their fibre, chemical and energy components via reuse and recycling options.
- Minimize the use of destruction and disposal options which do not allow recovery of fibre, chemical or energy components.
- Consider available information on potential environmental impact and the level of energy, transportation and social cost involved before adopting a particular option.

FIG.1: CANADIAN TREATED WOOD REMOVALS AVERAGE ANNUAL VOLUMES



	1995-99	2000-04	2005-09	2010-14
Waterborne	7.90	20.00	45.50	70.80
Oilborne	9.60	9.10	8.90	8.80