Environment Canada Environnement Canada

INDUSTRIAL TREATED WOOD USERS GUIDANCE DOCUMENT

Guidance for the Industrial Treated Wood User Concepts to include in an Environmental Management System concerning the use of Wood treated with CCA (chromated copper arsenate), ACA (ammoniacal copper arsenate), ACZA (ammoniacal copper zinc arsenate), Creosote and Pentachlorophenol

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Wood Preservation Strategic Options Process'
Guideline Development Working Group

Canada

NOTE:

The CEPA Strategic Options Process (SOP) Industrial Users Steering Committee is in the process of implementing the recommendations noted in section 6.4 of the *Strategic Options for the Management of CEPA-Toxic Substances from the Wood Preservation Sector, Volume 1, July 1, 1999*. This document has been developed by the Committee to address SOP recommendations D2(a) and D2(c), D3 and D5. See Appendix II for the complete list of SOP Recommendations.

The Industrial Users Steering Committee contracted the development of three technical documents – Life Cycle Assessment, Storage Guidelines for Treated Wood and a National Strategy for Waste Treated Wood. These documents were used to prepare this User Guidance Document. Complete references for these documents are given in Appendix I.

Also available in French under the title: *"DOCUMENT D'ORIENTATION À L'INTENTION DES UTILISATEURS DE BOIS TRAITÉ INDUSTRIEL*"

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TABLE OF CONTENTS

INDUSTRIAL TREATED WOOD USERS GUIDANCE DOCUMENT

1.0 INTRODUCTION

1.1 Overview

This document is designed to promote environmentally responsible management of the purchase, use, storage and disposal of wood treated with heavy-duty wood preservatives. Wood is often treated with substances that help to protect the wood from pests and the environment. These substances (i.e. ammoniacal copper arsenate (ACA)[1], ammoniacal copper zinc arsenate (ACZA), chromated copper arsenate (CCA), creosote, and pentachlorophenol (PCP)), however, can be harmful to human health and the environment. This document has been developed in response to the recommendations of the Government of Canada's Strategic Option Process (SOP) for the Wood Preservation Sector.

This document focuses on the recommendations for achieving reductions in releases from in-service use and post-use of industrial treated wood. It is intended to provide the guidance and background necessary for treated wood users to assist in meeting the intent of commitments and recommendations made in the SOR. The purpose of this document is not to provide a prescriptive means for meeting the recommendations but rather to allow industrial treated wood users the flexibility of meeting the intent of the recommendations in a manner that best suits their business needs while still meeting environmental requirements. Different companies will meet the intent of the recommendations in different manners.

The target audience for this report is Industrial Users of Treated Wood. This would include, but not be limited to, railways, power utilities, phone companies, and government department users of treated wood such as transportation agencies, fisheries and natural resources departments.

1.2 CEPA Strategic Options Process for Treated Wood

Priority substance assessments, conducted under the Canadian Environmental Protection Act (CEPA), concluded that polychlorinated dibenzodioxins and polychlorinated dibenzofurans; hexachlorobenzene; inorganic arsenic compounds; chromium (VI); and polycyclic aromatic hydrocarbons (PAHs) were toxic to the environment and/or human health. The priority substance assessment reports were published between 1990 and 1994 (see References).

The Strategic Options Process[2] was a process where goals, targets and management options were developed for substances found to be toxic under CEPA, 1988. Sector or substance related "Issue Tables" were created to develop recommendations on the most

1 Note that as of December 31, 2003, ACA is no longer registered in Canada, therefore, references in this document to ACA-treated wood refer to already in-service wood.

2 Toxic substances in Canada are no longer managed by the Strategic Options Process. The Toxics Management Process was developed to replace the Strategic Options Process as it was recognized that changes had to be made if the requirements for managing toxics set out in CEPA 1999 were to be met. The overall objective of the Toxics Management Process is similar to that of the Strategic Options Process.

effective and efficient options for managing the releases of toxic substances. Chaired by Environment Canada, the Issue Tables were multi-stakeholder consultative groups with representatives from industry, non-governmental organizations, and the federal and provincial governments. Each Issue Table provided input into the final Strategic Options Report which provided a set of recommendations to the Ministers of Environment and Health for managing toxic substances.

The wood preservation sector was identified as a potential source of release to the environment of these substances from the wood preservatives - ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), chromated copper arsenate (CCA), creosote, and pentachlorophenol (PCP).

The SOP for the Wood Preservation Sector was conducted by an Issue Table consisting of a wide range of stakeholders representing:

- Preservative Manufacturers;
- Wood Preservation Facilities;
- Industrial Treated Wood Users;
  - Railways
  - Telephone and Communication Companies
  - Electric Utilities
  - Public Works
  - Fisheries and Oceans (Marinas)
- Government Agencies;
  - Environment Canada
  - Health Canada (also Pest Management Regulatory Agency (PMRA))
  - Natural Resources Canada
  - Industry Canada
  - Fisheries and Oceans
- Non Government Environmental Organizations; and
  - Canadian Environment Network
  - Canadian World Wildlife Fund
- Academia.
  - University of New Brunswick/University of Toronto

The initial step taken by the Issue Table was to identify and quantify, using best available data, the current releases of CEPA toxic substances from the wood preservation sector. The following wood preservative lifecycle steps were examined as they were relevant to Canada:

- Wood Preservative Manufacturing (CCA and creosote only as other wood preservatives are not manufactured in Canada);
- Wood Preservative Treating;
- Treated Wood Use and Storage; and
- Disposal of Treated Wood.

The release data review established that releases of the identified CEPA toxic substances were occurring at various stages of the wood preservative's lifecycle and that opportunities for reduction of these releases existed. The Issue Table, therefore, prepared a set of recommendations that applied to all aspects of the lifecycle of wood preservatives.

All of the recommendations with the complete inventory of estimated releases are presented in the Issue Table's Strategic Option Report (SOR) (Environment Canada, 1999a). This report also summarizes the Strategic Options Process for the Wood Preservation Sector. The responsibility for implementation of the recommendations was part of the mandate of the two steering committees. The Manufacturers and Treaters Steering Committee was tasked to address the recommendations outlined in sections 6.2 and 6.3 of the SOR report and the Industrial Treated Wood Users Steering Committee was tasked to address the recommendations given in section 6.4 of the SOR report (see Appendix II).

In addition to the SOP process, the Pest Management Regulatory Agency (PMRA) of Health Canada has been working in cooperation with the US Environmental Protection Agency to re-evaluate the current registrations of the so called heavy duty wood preservatives – CCA, creosote and pentachlorophenol. (Agriculture Canada Announcement A92-02, *Re-evaluation of Heavy Duty Wood Preservatives*) As information from the re-evaluation becomes available, any applicable outcomes will be incorporated into subsequent revisions of this document.

1.3 Implementation of the SOP Recommendations

The recommendations in this document are focused on providing guidance for the appropriate use, storage and disposal of treated wood.

These recommendations have been compiled for industrial treated wood users, incorporating currently available information for using treated wood in a manner that reflects a commitment to Best Management Practices.

It is intended that stakeholders will implement the following recommendations into their existing practices, where applicable, by the end of 2006. It is noted that for some applications, suitable alternatives to wood treated with products such as pentachlorophenol, creosote, chromated copper arsenate, ammoniacal copper zinc arsenate, and ammoniacal copper arsenate are currently limited. Thus the careful, but continued use of these preservatives is necessary. In addition, some form of life cycle assessment may have to be conducted by the user to determine if choosing alternatives to wood treated with CEPA toxic substances is more beneficial to the environment. For example, some CEPA toxic releases are also associated with the manufacture of steel or concrete. An on-going process by the user to evaluate and review wood treated with CEPA toxic substances and their alternatives is necessary.

User groups should complete an initial self-audit and an interim progress report by the end of 2007. This progress report is to be submitted to the Industrial Users Steering Committee. A public report on the status of implementation of the recommendations by industrial users will be prepared by the end of 2008.

It is recognized that treated wood is used for a variety of purposes – for example railway ties, utility poles, fence posts, and highway posts. Treated wood is also used in aquatic applications – for example marine pilings, wharves, and bridge structures. The recommendations for Industrial Users of Treated Wood address all aspects of the life cycle from purchase through to appropriate reuse and disposal.

The explanation given with each recommendation indicates the minimum requirements to address each recommendation. Industrial users use treated wood in many diverse applications; therefore, different companies may have different mechanisms for addressing each of the recommendations. The intent of this User Guidance Document is not to provide a prescriptive means for meeting the recommendations, but to allow industrial users the flexibility of meeting the recommendations in a manner that best suits their business needs while still protecting the environment.

Although data limitations preclude a detailed quantified assessment of the impacts of implementing these recommendations, it is anticipated that consistent application will ensure that impacts to the environment and human health associated with treated wood use are minimized.

The nine recommendations are listed in sections 3.0 to 8.0.

2.0 BACKGROUND

2.1 Industrial (Heavy Duty) Wood Preservatives registered in Canada

Ammoniacal Copper Zinc Arsenate (ACZA) and Ammoniacal Copper Arsenate (ACA)
ACZA was registered for use in Canada in 1999. Since then, ACZA has replaced ACA for the treatment of products such as construction timbers (e.g. highway and bridge timbers), marine structures, utility poles, and fence posts. The ACA preservative system contained a 1:1 ratio of copper oxide and arsenic acid. The ACZA preservative system replaced half of the arsenic in ACA by zinc, and is formulated by mixing and dissolving copper oxide, arsenic acid, and zinc oxide: in a 2:1:1 ratio, respectively, in a solution of ammonium hydroxide, ammonium bicarbonate and water. Depending on the product, typical ACZA preservative retention will range from 4.0 kg/m^3 to 30 kg/m^3 total oxides in the treated wood (AWPA, 2000; CSA, Environment Canada, 1999b). Fixation of the ACZA components in wood is achieved through the evaporation of ammonia and mainly involves the precipitation of the ACZA components in the wood cells (Lebow and Tippie, 2001).

Chromated Copper Arsenate (CCA)
During the last three decades, CCA treated wood products have grown to dominate the Canadian wood preservation market. There has been a voluntary discontinuation of the use of CCA in non-industrial (residential) settings (see Re-evaluation Note REV2003-07, http://www.hc-sc.gc.ca/pmra-arla/english/pubs/rev-e.html). CCA is currently used to treat lumber and timber products (e.g., highway and bridge structures and retaining structures), plywood, piles, utility poles, and for wood to be used on farms (e.g., fence posts and poles). The CCA formulation that is used in Canada is the Type-C formulation. Of the total active ingredients (e.g., 72%), Type-C CCA consists of approximately 50% chromic acid (e.g., 32%), 19% copper oxide (e.g., 13.7%), and 31% arsenic acid (e.g., 22.3%). Depending on the product, typical CCA preservative retentions will range from 4.0 kg/m^3 to 30 kg/m^3 total oxides in the treated wood (CSA, 1997; Environment Canada, 1999b).
Proper fixation of the CCA components to wood is also essential for minimizing potential adverse effects to the environment and/or human health. Fixation of the CCA components in wood is time, temperature, and humidity dependent and involves the reaction of the CCA components with the wood components. For example, approximately 285 hours are required to achieve 99% CCA fixation at 21^{o}C, while only 4.5 hours are required to achieve this same level of fixation at 71^{o}C (Lebow and Tippie, 2001). At the end of the fixation period, the CEPA toxic hexavalent chromium (CrVI) is completely consumed, eliminating treated wood as a potential source of this CEPA toxic substance.

Pentachlorophenol (PCP)
Since 1981, PCP use in Canada has been on the decline due to restrictions on its use. Currently, PCP is used for the treatment of utility poles, cross-arms, posts, and construction timbers. PCP is produced by reacting phenol with chlorine. The resulting compound usually contains about 86% PCP and about 10% other chlorophenols, such as

tetrachlorophenol and trichlorophenol. PCP also contains trace amounts of polychlorinated dibenzodioxins, polychlorinated dibenzofurans, and hexachlorobenzene impurities. Petroleum oils are normally used to carry the PCP into the wood structure. The Canadian Standards Association O80 Series-97 Wood Preservation Standards (Standard O80.2-97) list the retention of PCP in lumber, timber, etc, as 4.8 kg/m^3 (CSA, 1997).

Creosote

Creosote is a complex and variable mixture of more than 300 compounds that are produced from the high temperature carbonization of bituminous coal. The major classes of compounds are polycyclic aromatic hydrocarbons (PAHs) (up to 90%), tar acids, and tar bases. In Canada, creosote is used primarily for the treatment of railway ties, marine pilings, construction timbers, and utility poles for export. Petroleum oils are often used as a diluent for the creosote. Depending on the product, typical creosote preservative retention will vary. The Canadian Standards Association Standard 080.5-97 lists the retention of creosote in posts as 80 kg/m^3.

2.2 Treated Wood Preservative Releases and Assessment of Environmental & Health Impacts

The Canadian wood preservation industry has existed since 1910. The industry treats wood with heavy-duty waterborne and oil-borne preservatives for both industrial and residential market applications (Environment Canada, Management of Toxic Substances Website).

Wood treated with preservatives is used in a wide variety of applications. Treated wood provides a long lasting and economical alternative to untreated wood. The applied wood preservative provides protection from fungi and other pests. If untreated, fungi and other pests will relatively quickly break down the structural integrity of the wood. Providing treatment to the wood results in fewer trees being harvested, therefore, protecting forests. It is estimated that wood preservatives extend the useful life of wood by 45 years or more (Lebow et al., 2000).

The inherent toxicity associated with wood preservative chemicals may result in risk to the environment and human health. The Issue Table estimated CEPA toxic substance releases for the primary applications of CCA, creosote and PCP while in service (see Appendix III, Tables 1A, 2A and 3A). <u>It is emphasized that these release estimates are based on estimated leach rates calculated from limited data sources and some data of uncertain quality.</u> The data are intended to provide an estimate of the possible extent of releases based on information available to date. These estimates show that treated wood is used widely across the country and that releases are from diffuse sources. Releases are also shown to be very small in local areas surrounding treated wood.

The Issue Table also calculated estimates of the CEPA toxic substances removed from primary service and either reused / recycled with the treated wood itself or landfilled (see Appendix III, Tables 1B, 2B, and 3B).

A complete summary of the methodology used to calculate these release estimates is given in the Strategic Option Report for the Wood Preservation Sector (Section 3) (Environment Canada, 1999a).

The mechanism of release for the CEPA toxic substances and the ultimate fate of these substances are not well understood. CEPA toxic substances have been measured in soil immediately surrounding the treated wood. Measured preservative losses from the treated wood will be due to leaching and gravitational migration from the wood to the soil, biodegradation and/or photodegradation, and volatilization. The data given in Appendix III are intended to provide an estimate of the relative magnitude of the potential releases of these substances from preserved wood.

The Issue Table determined that the greatest opportunities for reducing these releases occur at the treatment facility[3] and when taking the wood out of primary service (i.e., preventing inappropriate recycling, reuse and disposal). Making certain that new wood is treated correctly to minimize in-service releases and appropriately managing the wood taken out of service is the focus of the recommendations provided by the Issue Table to user groups. Additional recommendations have been made to ensure that information to better quantify the releases from wood and the impact of these releases on the environment is collected or generated (see Appendix II).

Assessment of Environmental and Health Impacts

Health effects are generally classified as short-term (acute) or long-term (chronic). Although dose dependent, potential adverse health effects from exposure to treated wood can occur from inhalation of vapours, inhalation and/or ingestion of contaminated dust particles, contact to skin, and ingestion of surface dislodged materials or contaminated soil.

Rain and/or water from melted snow can leach toxic substances from treated wood. Depending on factors such as time, quantity and substance characteristics, the release of these contaminants into soil, groundwater, surface water, or sediment may affect the immediately adjacent biota and ecosystems.

The preservatives used for treating wood are currently registered with the Pesticide Management Regulatory Agency (PMRA). These registered products have restrictions relating to their use stipulated as part of their registration label. Currently the PMRA and the US Environmental Protection Agency are collaborating on a re-evaluation of the health and environmental risks associated with the use of these substances. As this information becomes available it will be posted on the PMRA and USEPA websites (PMRA — www.hc-sc.gc.ca/pmra-arla/english/reeval/reeval-e.html and USEPA — www.epa.gov/pesticides.) As this information from this re-evaluation becomes available, any applicable outcomes will be incorporated into subsequent revisions of this document.

3 Recommendations for reducing the releases at the treatment plant are part of the mandate of the Treaters and Manufacturers Steering Committee. For a summary of the activities of this Steering Committee, see Appendix IV.

2.3 SOP Supporting Documents on Storage, Waste Management and Lifecycle Analysis

Three documents were developed through the Strategic Option Process (SOP) Industrial Treated Wood Users Implementation Steering Committee to inform the development of the User Guidance Document: Guidelines for Treated Wood Storage Facilities (Earth Tech Canada Inc and EcoBec 2000 Inc., 2002), National Strategy for the Management of Post-use Preservative Treated Industrial Wood (Konasewich et at, 2001), and Guidelines for Life Cycle Analysis Methodology Development for the Wood Preservation Sector (Raynolds et al., 2000). The committee has drawn heavily on the information in these documents to develop these guidelines on the appropriate use, storage and disposal of the treated wood. See Appendix I for complete references of these documents.

Guidelines for Treated Wood Storage Facilities

The storage guidelines provide direction regarding the Best Management Practices for the siting, design, operation and maintenance of treated wood storage facilities. The guidelines are applicable to industrial, governmental and institutional end users, and contractors who own inventories of new or used treated wood. They are not applicable to retail establishments and consumers. Although references to the Guidelines are made throughout this document, a summary of key recommendations is found in Section 4.3.

National Strategy for the Management of Post-use Preservative Treated Industrial Wood

This strategy was developed to provide guidance on minimizing the amount of used industrial treated wood going requiring disposal. The strategy provides an overview of approaches to achieving this goal. The approaches are organized into a hierarchy listed below according to priority:

- Abatement or elimination;
- Reduction or modification;
- Reuse;
- Recycling;
- Treatment; and
- Disposal.

The strategy is incorporated into the various recommendations in the document (recommendations 6 through 8 in particular) and is outlined in greater detail in Section 7.4.

Guidelines for Life Cycle Analysis Methodology Development for the Wood Preservation Sector

These guidelines provide a summary of life cycle assessment (LCA) methodologies available to treated wood user for analyzing the cradle to grave environmental costs and benefits of various options. A Life Cycle Value Assessment (LCVA) methodology is proposed for use in the analysis of treated wood options as it incorporates other financial, social, safety and logistics impacts over a system's life cycle.

Examples of some specific methodologies that users might find useful include ones for new distribution lines and new railway ties. The objective of these decision making LCA methodologies is to assist the designer in selecting the most appropriate new system. Both methodologies have similar input parameters, including general parameters such as location, life expectancy, financial criteria (discount, tax and inflation rates) and specific parameters relating to the size of the project, costs, transportation and disposal options. These input parameters should be used to generate a life-cycle value assessment containing information such as the net present cost of the project, the life-cycle material and energy inputs and associated environmental releases for each option.

A qualitative Life-Cycle Value Assessment (LCVA) uses a systematic methodology to identify, quantify and analyze the environmental, financial (and if desired, social) implications of each of the activities involved in producing and consuming a product or service. The methodology works through six main steps:

- Goal Definition;
- Scoping;
- Inventory Assessment;
- Impact Assessment;
- Design Improvement;
- Reports.

The LCVA methodology can, therefore, be used as a:

- A business analysis tool providing more complete information for making better project decisions on the basis of environmental, financial and socio-economic considerations;
- A design improvement tool that identifies and analyzes full costs and benefits of various options for reducing environmental impacts and improving total project economics;
- A pragmatic merger of environmental life-cycle analysis, business financial value assessment, and systems (process) engineering design improvement.

Conducting a detailed life-cycle value assessment is beyond the scope of this document due to the complexity of the subject. As such, users should consult other documentation for detailed techniques required for a qualitative assessment. However, the parameters mentioned above should be used when conducting basic assessments of the costs associated with any alternative.

Although these methodologies are not formally applied here, the recommendations outlined in this document reflect a lifecycle approach and consider the factors outlined above.

3.0 PURCHASING

3.1 Recommendation 1 – Purchasing Policies

Use purchasing policies that make certain any treated wood purchased has been treated appropriately

The company should have documented purchasing specifications, guidance documents or procedures that would show commitment to the recommendation.

Purchasing specifications may be applicable Canadian Standards Association (CSA) standards, industry or company specifications (that are consistent with CSA standards), industry endorsed Best Management Practices (e.g., Best Management Practices for the Use of Treated Wood in Aquatic Environments (CITW and WWPI, 1997), and Guidelines to Protect Fish and Fish Habitat from Treated Wood Used in Aquatic Environments in the Pacific Region (Hutton and Samis, 2000)). Treated wood imported from other countries shall meet acceptable international standards. Alternately, the purchasing policies may reference purchasing treated wood from treatment facilities that follow Recommendations for the Design and Operation of Wood Preservative Facilities (TRDs), published by Environment Canada and the Canadian Institute of Treated Wood (Environment Canada, 1999b).

A listing of relevant standards / guidelines is given in Appendix V. This listing is designed to give guidance to users about appropriate treatment specifications. It is not intended that these standards/guidelines be used in place of more stringent industry or company specifications.

Some specific recommendations for purchasing treated wood are outlined below by type:

Purchasing ACZA treated wood

Proper fixation of the ACZA components to wood and clean surfaces, free of surface deposits are essential for minimizing potential adverse effects to the environment and/or human health. Users should specify that the wood be properly fixed and the surfaces free of surface deposits before delivery of the product. Fixation of the ACZA components in wood is achieved through the evaporation of ammonia and mainly involves the precipitation of the ACZA components in the wood cells (Lebow and Tippie, 2001). The Canadian Institute of Treated Wood has established Best Management Practices to ensure adequate fixation of ACZA prior to the treated wood being placed in-service (CITW and WWPI, 1997). An obvious ammonia odour in the ACZA treated product usually indicates that the preservative has not been properly fixed. In such cases, the treated wood should not be accepted for use (Hutton and Samis, 2000). Specifiers and installers of ACZA treated products should require assurance that the products were produced in conformance with industry endorsed Best Management Practices.

Purchasing CCA treated wood

The Canadian Institute of Treated Wood has also established Best Management Practices to ensure adequate fixation of CCA and avoidance of surface deposits on treated wood prior to the treated wood being placed in-service (CITW and WWPI, 1997). A standard method for confirming fixation in CCA treated products is the use of the Chromotropic Acid test (AWPA Method A3, section 11) (AWPA, 2000). Specifiers and installers of CCA treated products should require assurance that the products were produced in conformance with industry endorsed Best Management Practices.

Purchasing PCP treated wood

In order to help minimize potential adverse effects to the environment and/or human health, the Canadian Institute of Treated Wood has established Best Management Practices for PCP treated products (CITW and WWPI, 1997). Specifiers and installers of PCP treated products should require assurance that the products were produced in conformance with industry endorsed Best Management Practices.

Purchasing Creosote treated wood

In order to help minimize potential adverse effects to the environment and/or human health, the Canadian Institute of Treated Wood has established Best Management Practices for creosote treated products (CITW and WWPI, 1997). Specifiers and installers of creosote treated products should require assurance that the products were produced in conformance with industry endorsed Best Management Practices.

4.0 STORAGE

Guidelines for Treated Wood Storage Facilities have been developed through the SOP process. The Guidelines provide guidance on Best Management Practices for the siting, design, operation and maintenance of treated wood storage facilities. In addition to the general recommendations for locating and managing storage outlined below, users should reference the guidelines summarised in Section 4.3.

4.1 Recommendation 2 – Locating New Storage Facilities

Address potential impacts appropriately in locating storage facilities for treated wood.
The company should have documented procedures as to how new permanent storage facilities are located (the recommendation does not necessarily apply to existing storage facilities). These procedures must clearly show that potential impacts to the environment are considered during the siting process. Guidance for the siting, design and operation of treated wood storage facilities, as well as mitigation of impacts, is presented in Section 4.3.

The siting of storage areas for treated wood may require some type of regulatory approval in some jurisdictions. Engineering designs may be required as background information for the approval. If no regulatory approvals are required, then engineering design to address any potential impacts on the environment from storing treated wood is at the discretion of the company. The design should reasonably mitigate any significant impacts on the environment. However, in some instances, it may be more practical to adopt operational practices than to try to mitigate the impact via engineering design.
During construction/upgrade of treated wood facilities, companies may temporarily place treated wood in storage areas adjacent to the construction/upgrade activities. Guidance for the siting, design, and operation of these temporary treated wood storage facilities is also given in *Guidelines for Treated Wood Storage Facilities* (see section 4.3 and Appendix I). The intent of these guidelines for temporary storage is that if there has been any visual environmental impacts from the temporary storage of treated wood (e.g., stained soil), then the area shall be remediated to pre-storage conditions.

Temporary storage areas are considered to be designated areas where treated wood is stored for a period of less than 90 days. The placement of treated wood adjacent to the site of subsequent installation (e.g., the placement of poles along road sites) is not considered to be storage. This placement is considered to be part of the installation process and is not subject to the guidelines given for storage. Installation requirements are addressed in section 5.0.

4.2 Recommendation 3 – Managing Existing Storage Facilities

Address potential impacts appropriately in managing storage facilities for treated wood.
The company should have documentation describing how they manage existing storage facilities or areas. This may include but is not limited to, documented operational practices or memos to applicable staff. The potential impacts may vary among sectors and/or geographical areas.

Existing storage facilities (i.e., those storage areas installed prior to the release of this User Guidance Document) are often decades old and were not located in line with today's higher standards for environmental protection. Therefore, it may not be practicable to eliminate all impacts. However, impacts should be managed in a reasonable manner. Guidance on the management of treated wood storage facilities is presented in Section 4.2. Additional guidance is also given in *Guidelines for Treated Wood Storage Facilities* (see section 4.3 and Appendix I). Note that existing storage facilities would be more closely expected to follow operational sections of this Guidance document.

In addition, the Canadian Council of Ministers of the Environment (CCME) and/or provinces have developed guidelines on the management of contaminated sites with established limits given for substances found in treated wood. Existing storage sites can be managed in such a manner to prevent risk of any off site movement of treatment products and/or residuals. Existing sites will be determined to be managed correctly if CEPA-toxic materials (where limits have been developed by CCME and/or the applicable province) associated with treated wood are not found in levels above recommended guidelines in areas outside the boundaries of the storage sites. This determination can be made by either monitoring or assessment by a qualified person. Relevant guidelines have been provided in Appendix VI of this document as guidance in this area.

During construction/upgrade of treated wood facilities, companies may temporarily place treated wood in storage areas adjacent to the construction/upgrade activities. If there have been any visible environmental impacts from the temporary storage of treated wood (e.g., stained soil), then the area should be remediated to pre-storage conditions. Guidance for the operation of these temporary treated wood storage facilities is also given in *Guidelines for Treated Wood Storage Facilities* (see section 4.3 and Appendix I).

4.3 Guidelines for Treated Wood Storage Facilities

Guidelines for Treated Wood Storage Facilities have been developed through the Guideline Development Working Group of the Industrial Treated Wood Users Implementation Steering Committee, a sub-group within the SOP. (See Appendix I for a reference of the complete document).

The Guidelines for Treated Wood Storage Facilities provides direction regarding Best Management Practices for the siting, design, and operation and maintenance of treated wood storage facilities, and is applicable to wood treated with chromated copper arsenate, ammoniacal copper zinc arsenate, ammoniacal copper arsenate, creosote and pentachlorophenol. These guidelines apply to industrial, governmental and institutional end users of new or used treated wood; and contractors and sub contractors who own inventories of new or used treated wood. The guidelines do not apply to retail establishments and consumers[4].

4 The Treaters and Manufacturers Steering Committee addressed issues associated with Consumer Lumber. This included a labeling program and Consumer Information Sheets that gave specific information on how to use and dispose of residential treated wood. Consumer Information sheets are available at www.ccasafetyinfo.ca.

The Guidelines for Treated Wood Storage Facilities apply to both new and existing storage facilities. The intent of these guidelines is to prevent wood preservatives from migrating to the environment. This can be accomplished in many different ways, therefore, the document is not intended to be prescriptive. Alternative approaches may be equally effective or more suitable to site-specific conditions to meet the intent of the guidelines. These alternative approaches should be documented. A new treated wood storage facility would be expected to implement the intent of all the recommendations in the guidelines document. Existing storage facilities (often decades old) were not located in line with today's higher standards for environmental protection. Therefore, it may not be practicable for an existing treated wood storage facility to implement the intent of all the recommendations of the guidelines document. An existing treated wood storage facility would, however, be expected to immediately implement the intent of the recommendations in the Operations and Maintenance section of the guidelines document. The intent of the recommendations for Siting and Design would be expected to be implemented, where practicable, as an existing treated wood storage facility is upgraded.

The Guidelines for Treated Wood Storage Facilities are intended to support and direct end users of treated wood in the storage of these products. Consideration is given to the practical application of treated wood storage solutions and physical, economic, and operational aspects that are required to implement these guidelines. This includes continuation of existing practices that are compliant with regulatory requirements and conformant to industry standards and Best Management Practices.

4.3.1 Using the Storage Guidelines

The Guidelines for Treated Wood Storage Facilities are set out in table format to aid the user in quickly finding specific information. Tables are then divided by duration of storage, type of storage, and volume of materials being stored. Factors considered during the development of these guidelines included:

- Physical conditions of proposed storage site (soil type, topography, drainage);
- Proximity to environmentally sensitive areas;
- Proximity to areas of human activity;
- Type of storage (in-field or main storage);
- Duration of storage (temporary or long-term);
- Volume of material being stored (55 m^3 or less, or more than 55m^3);
- Storage site operation and maintenance procedures.

In-field storage is considered to be an interim usage area away from a main storage facility, generally near the point of final installation. A main storage facility is a location where treated wood is stored on a regular basis for distribution to in-field locations. Temporary storage is considered to be 90 days or less in duration, while long-term storage is considered to be more than 90 days in duration. A treated

wood volume of 55 m^3 or less is considered to cover smaller quantities of stored materials such as six bundles of rail ties or 40 utility poles. A treated wood volume of more than 55 m^3 is considered to cover larger quantities of stored materials such as multiple bundles of rail ties or more than 40 utility poles.

4.3.2 Finding Storage Guideline Information

The Guidelines for Treated Wood Storage Facilities are organized to allow a user to obtain specific information in a timely and effective manner. The following outlines the key steps on how to use the guidelines:

Step 1: Identify the appropriate table required on the basis of duration of storage (e.g., 90 days or less or more than 90 days).
Step 2: Identify the particular issue(s) being addressed (e.g., siting, design or operation and maintenance), then go to the appropriate section(s) in the table.
Step 3: Refer to the relevant sections in the table depending on the type of storage being addressed (e.g., in-field or storage facility) and the volume of material being stored (e.g., 55m^3 or less or more than 55m^3).
Step 4: Use the information as guidance on the options available to develop a specific work plan for the treated wood storage facility.

Guidelines for the storage treated wood for a duration of 90 days or less are presented in Table 1, while guidelines for the storage treated wood for a duration of more than 90 days are presented in Table 2.

Table 1: Siting, Design and Operation/Maintenance Guidelines for 90 Days or Less Treated Wood Storage

Type of Storage	Volume of Material	Factors
Siting Factors – 90 Days or Less Storage		
In-Field	55 m^3 or less	• Locate a minimum of 10 metres from environmentally sensitive areas. • Store on flat ground or on slope of less than 10%.
	More than 55 m^3	• Locate a minimum of 30 metres from environmentally sensitive areas. • Store on flat ground or on slope of less than 10%.
Storage Facility	55 m^3 or less	• Locate a minimum of 10 metres from environmentally sensitive areas. • Store on surfaces with limited permeability, such as clay and compacted soils, asphalt or concrete, where practicable. • Store on flat ground or on slope of less than 10%.
	More than 55 m^3	• Locate a minimum of 30 metres from environmentally sensitive areas. • Store on surfaces with limited permeability, such as clay and compacted soils, asphalt or concrete, where practicable. • Store on flat ground or on slope of less than 10%. • Store > 30 metres from well used for potable and/or irrigation water supply. • Store in area where run-off can be captured and managed.
Design Factors – 90 days or Less Storage		
In-Field	55 m^3 or less	• Elevate treated wood to avoid direct contact with water run-off, where practicable. • Provide absorbent base, such as wood chips, under treated wood, where practicable.
	More than 55m^3	• Elevate treated wood to avoid direct contact with water run-off. • Provide absorbent base, such as wood chips, under treated wood, where practicable.
Storage Facility	55 m^3 or less	• Elevate treated wood to avoid direct contact with water run-off, where practicable. • Clear treated wood storage areas of combustible ground vegetation for > 5.0 metres. • Store treated wood materials at least 10 metres from adjacent bush or forested areas. • Provide absorbent base, such as wood chips, under treated wood, where practicable. • Provide emergency response information, such as emergency telephone number. • Provide fire protection equipment, such as fire extinguisher, as required.
	More than 55m^3	• Elevate treated wood to avoid direct contact with water run-off. • Clear treated wood storage areas of combustible ground vegetation for > 5.0 metres. • Store treated wood materials at least 30 metres from adjacent bush or forested areas. • Provide absorbent base, such as wood chips, under treated wood, where practicable. • Provide emergency response information, such as emergency telephone number. • Provide fire protection equipment, such as fire extinguishers, as required.

Table 1: Siting, Design and Operation/Maintenance Guidelines for 90 Days or Less Treated Wood Storage *(continued)*

Operation and Maintenance Factors – 90 Days or Less Storage		
In-Field	55 m^3 or less	• Deliver treated wood, as required, to minimize storage time "in-field". • Inspect treated wood upon delivery or another specified time for surface deposits and dryness. • Place tarpaulin or weather-resistant material over treated wood products, where practicable. • Inspect the storage area for evidence of leaching treatment chemicals.
	More than 55 m^3	• Deliver treated wood, as required, to minimize storage time "in-field". • Inspect treated wood upon delivery or another specified time for surface deposits and dryness. • Inspect the storage area periodically, for evidence of leaching treatment chemicals.
Storage Facility	55 m^3 or less	• Deliver treated wood, as required, to minimize storage time "on-site". • Inspect treated wood upon delivery or another specified time, for surface deposits and dryness. • Place tarpaulin or weather-resistant material over treated wood products, where practicable. • Inspect the storage area for evidence of leaching treatment chemicals.
	More than 55 m^3	• Deliver treated wood, as required, to minimize storage time "on-site". • Inspect treated wood upon delivery or another specified time, for surface deposits and dryness. • Inspect the storage area for evidence of leaching treatment chemicals. • Construct a temporary structure over the treated wood storage area, where practicable. • Where necessary, monitor soils, surface waters or groundwater for treatment chemical levels.

Table 2: Siting, Design and Operation/Maintenance Guidelines for more than 90 Days Treated Wood Storage

Type of Storage	Volume of Material	Factors
Siting Factors – More than 90 Days Storage		
In-Field	55 m^3 or less	• Locate a minimum of 10 metres from environmentally sensitive areas. • Locate a minimum of 3 metres from drainage ditches. • Store on surfaces with limited permeability, such as clay and compacted soils, asphalt or concrete. • Store on flat ground or on slope of less than 10%.
	More than 55 m^3	• Locate a minimum of 30 metres from environmentally sensitive areas. • Locate a minimum of 3 metres from drainage ditches. • Store on surfaces with limited permeability, such as clay and compacted soils, asphalt or concrete. • Store on flat ground or on slope or less than 10%. • Locate outside of 100-year flood plain in lower areas, where practicable. • Store > 30 metres from well used for potable and/or irrigation water supply.
Storage Facility	55 m^3 or less	• Locate a minimum of 10 metres from environmentally sensitive areas. • Locate a minimum of 3 metres from drainage ditches. • Store on surfaces with limited permeability, such as clay and compacted soils, asphalt or concrete. • Store on flat ground or on slope of less than 10%. • Locate outside of 100-year flood plain in lower areas, where practicable. • Store > 10 metres from well used for potable and/or irrigation water supply.
	More than 55 m^3	• Locate a minimum of 30 metres from environmentally sensitive areas. • Locate a minimum of 3 metres from drainage ditches. • Store on surfaces with limited permeability, such as clay and compacted soils, asphalt or concrete. • Store on flat ground or on slope of less than 10%. • Locate outside of 100-year flood plain in lower areas, where practicable. • Store > 30 metres from well used for potable and/or irrigation water supply. • Store in area where run-off can be captured and managed.
Design Factors – More than 90 Days Storage		
In-Field	55 m^3 or less	• Elevate treated wood to avoid direct contact with water run-off, where practicable. • Store treated wood materials at least 10 metres from adjacent bush or forested areas. • Provide absorbent base, such as wood chips, under treated wood, where practicable. • Provide emergency response information, such as emergency telephone number. • Provide fire protection equipment, such as fire extinguisher, as required. • Limit access to the storage area by designating access roads for users vehicle only.
	More than 55 m^3	• Elevate treated wood to avoid direct contact with water run-off, where practicable. • Clear treated wood storage areas of combustible ground vegetation for > 5.0 metres. • Store treated wood materials at least 30 metres from adjacent bush or forested areas. • Provide proper fencing and/or signage to designate storage area, where practicable • Provide absorbent base, such as wood chips, under treated wood, where practicable. • Provide emergency response information, such as emergency telephone number. • Provide fire protection equipment, such as fire extinguishers, as required. • Store in area where run-off can be captured and managed. • Limit access to the storage area by designating access roads for user's vehicle only.

Table 2: Siting, Design and Operation/Maintenance Guidelines for more than 90 Days Treated Wood Storage *(continued)*

Type of Storage	Volume of Material	Factors
Storage Facility	55 m^3 or less	• Elevate treated wood to avoid direct contact with water run-off. • Clear treated wood storage areas of combustible ground vegetation for > 5.0 metres. • Store treated wood materials at least 10 metres from adjacent bush or forested areas. • Provide proper fencing and/or signage to designate storage area, where practicable • Provide absorbent base, such as wood chips, under treated wood, where practicable. • Provide emergency response information, such as emergency telephone number. • Provide fire protection equipment, such as fire extinguishers, as required. • Limit access to the storage area by designating access roads for users vehicle only.
	More than 55 m^3	• Elevate treated wood to avoid direct contact with water run-off, where practicable. • Clear treated wood storage areas of combustible ground vegetation for > 5.0 metres. • Store in area where run-off can be captured and managed. • Store treated wood materials at least 30 metres from adjacent bush or forested areas. • Provide proper fencing and/or signage to designate storage area, where practicable. • Provide absorbent base, such as wood chips, under treated wood, where practicable. • Provide emergency response information, such as emergency telephone number. • Provide fire protection equipment, such as fire extinguishers, as required. • Limit access to the storage area by designating access roads for user's vehicle only.
Operation and Maintenance Factors – More than 90 Days Storage		
In-Field	55 m^3 or less	• Deliver treated wood, as required, to minimize storage time "in-field". • Inspect treated wood upon delivery or another specified time for surface deposits and dryness. • Place tarpaulin or weather-resistant material over treated wood products, where practicable. • Inspect the storage area for evidence of leaching treatment chemicals.
	More than 55 m^3	• Order treated wood, as required, to minimize storage time "in-field". • Inspect treated wood upon delivery or another specified time for surface deposits and dryness. • Inspect the storage area periodically, for evidence of leaching treatment chemicals.
Storage Facility	55 m^3 or less	• Deliver treated wood, as required, to minimize storage time "on-site". • Inspect treated wood upon delivery or another specified time for surface deposits and dryness. • Place tarpaulin or weather-resistant material over treated wood products, where practicable. • Inspect the storage area for evidence of leaching treatment chemicals.
	More than 55 m^3	• Deliver treated wood, as required, to minimize storage time "on-site". • Inspect treated wood upon delivery or another specified time for surface deposits and dryness. • Inspect the storage area for evidence of leaching treatment chemicals. • Store in area where run-off can be captured and managed. • Construct a temporary structure over the treated wood storage area, where practicable. • Where necessary, monitor soils, surface waters or groundwater for treatment chemical levels.

5.0 INSTALLATION AND HANDLING

5.1 Recommendation 4 – Installation and Handling

Install and handle treated wood in a manner that appropriately considers environmental impacts and the health and safety of workers and the general public

The company should have documentation outlining specific environmental considerations for the installation of treated wood. This may include specifications on treatment types and/or distance limits from water wells, watercourses, sensitive sites, etc.

Good occupational hygiene practices should be followed when installing treated wood. Information sheets on the proper handling of treated wood have been developed by the Canadian Institute of Treated Wood.

Some basic objectives to consider when developing installation procedures to minimize environmental impacts include:

- Construction should be scheduled as to minimize the risk to aquatic organisms. For example, construction should not occur during migration, spawning, or other sensitive life stages of fish or other aquatic organisms in the area. Information on acceptable time periods to build can be obtained from the Department of Fisheries and Oceans, as well as the appropriate local environmental regulatory agencies;

- Design of the structure should take into account the environmental effects of treated wood. Planning of the structure so as to minimize the amounts of treated wood in contact with water is one example. Also, pressure treated wood surfaces that are subject to abrasion (through marine vessel contact, etc.) should be armored with protective polyethylene strips. For floating structures, the use of anchors is preferred over the use of pilings;

- Whenever possible, wooden members should be prefabricated to the desired specifications before pressure treatment. Environmental contamination is minimized since field application of wood preservatives is unnecessary, and there is no discharge of treated sawdust, shavings, or other construction debris;

- Good housekeeping practices should be followed when work on a treated wood installation project is complete. This should include clean-up and disposal of any end-cuts and debris created by construction activities. When end-cut preservatives must be applied, measures should be put in place to prevent entry into the environment surrounding the installation (including soil and waterbodies);

- Wood treated with oil-borne preservatives may produce an oily sheen when it comes into contact with water. Booms of absorbent material should be placed around the structure, or downstream to soak up any oil on the surface of the water. These booms should remain in place until all visible traces of oily surface residues are gone. Also, absorbent materials should always be on hand to quickly clean up spills, or to wipe away excess preservative on the wood if leaching does occur.

Any absorbent material used must be disposed of following appropriate procedures;

- Wood that is treated with waterborne preservatives can also be treated with stains or water repellents. Water repellents prevent warping, splitting, and twisting of the treated wood, especially of horizontal members such as decking. They also reduce the amount of leaching of preservatives from the treated wood, since they don't allow water to enter. Both water repellents and stains can be added to the pressure treatment process, or applied later in the field. Factory pressure treatment of water repellents is preferred since it forces repellent deep into the wood, increasing its durability, as well as eliminating the environmental hazards associated with field application.

There are numerous other guidance documents that should also be consulted when developing environmental protection methods to be used during installation. Some examples of documents that should consulted include:

- CITW and WWPI. 1997. Best Management Practices for the Use of Treated Wood in Aquatic Environments. Canadian Institute of Treated Wood and Western Wood Preservers Institute, www.wwpinstitute.org;

- Hutton, K. E. and S. C. Samis. 2000. Guidelines to protect fish and fish habitat from treated wood used in aquatic environments in the Pacific Region. Can. Tech. Rep. Fish. Aquat. Sci. 2314: vi + 34 p.;

- Treated Wood in Aquatic Environments, Western Wood Preservers Institute, http://www.wwpinstitute.org/pdffiles/AquaticGuide.pdf;

- Lebow, Stan T.; Tippie, Michael. 2001. Guide for minimizing the effect of preservative-treated wood on sensitive environments. Gen. Tech. Rep. FPL– GTR– 122. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 18 p.

Handling of ACA or ACZA treated wood

It is recommended that individuals working with ACA or ACZA treated wood wear acceptable protective gear, including gloves for handling treated wood and dust masks for sawing or otherwise machining of the wood to minimize this low-level exposure. The Canadian Institute of Treated Wood has developed an information sheet on the proper handling of ACA (http://www.citw.org/using_specifying/industrial/guidelines/aca.htm). To avoid potential long term exposures, always follow the proper handling procedures. Additional information on ACZA and ACA health hazards can be found in the product's Material Safety Data Sheets (MSDS).

Handling of CCA treated wood

It is recommended that individuals working with CCA treated wood wear acceptable protective gear, including gloves for handling treated wood and dust masks for sawing or otherwise machining of the wood to minimize this low-level exposure. The Canadian Institute of Treated Wood has developed an information sheet on the proper handling of CCA treated wood (http://www.citw.org/using_specifying/industrial/guidelines/cca.htm). To avoid potential long term exposures, always follow the proper handling procedures. Consumer Information Sheets have also been developed for residential CCA treated wood (http://www.ccasafetyinfo.ca). Additional information on CCA health hazards can be found in the product's Material Safety Data Sheets (MSDS).

Handling of PCP treated wood

To avoid these potential toxicity effects from contact with PCP treated wood, it is recommended that individuals working with treated wood wear acceptable protective gear, including gloves for handling treated wood and dust masks for sawing or otherwise machining of the wood. The Canadian Institute of Treated Wood has developed an information sheet on the proper handling of PCP treated wood (http://www.citw.org/using_specifying/industrial/guidelines/penta.htm). To avoid potential long-term exposures, always follow the proper handling procedures. Additional information on PCP health hazards can be found in the product's Material Safety Data Sheets (MSDS).

Handling of Creosote treated wood

To avoid these potential toxicity effects from contact with creosote treated wood, it is recommended that individuals working with treated wood wear acceptable protective gear, including gloves for handling treated wood and dust masks for sawing or otherwise machining of the wood. The Canadian Institute of Treated Wood has developed an information sheet on the proper handling of PCP treated wood (http://www.citw.org/using_specifying/industrial/guidelines/creosote.htm). To avoid potential long-term exposures, always follow the proper handling procedures. Additional information on creosote health hazards can be found in the product's Material Safety Data Sheets (MSDS).

6.0 SENSITIVE SITES

6.1 Recommendation 5 – Consider alternatives in sensitive sites

Consider, where practicable, alternatives to the use and in-service re-treatment of wood treated with CEPA-toxic substances in areas that may be sensitive in terms of the environment and human health, such as areas in close proximity to potable water supplies and aquatic resources*.

There is currently no common set of criteria to determine if a site is sensitive to the use of treated wood. In addition, the route of release of toxic substances from treated wood while in service, as well as the fate of any released substance in the environment, is not well understood. Refinement of release estimates for these substances, including arsenic in poles and creosote rail ties, and their impacts on the environment will be conducted.

In the interim, companies are encouraged to use a company-approved definition of a sensitive site taking into account local by-laws, provincial legislation and local concerns, or the following as appropriate:

A "sensitive site" is defined as any area or location for which additional factors must be considered and care taken because of the potential for or the perception that an action is detrimental to the well being of the area.

This recommendation primarily applies to new construction but can be used, at the discretion of the company, during repair and upgrades, where practicable. Agreement to adhere to this recommendation does **not** require that the facility replace currently in-service treated wood, which may be adjacent to sensitive sites.

Alternatives can include wood treated with preservatives that do not contain CEPA-toxic substances or products made with alternate materials (e.g., composites, concrete, or steel). Note, at present, there are limited alternatives to wood treated with CEPA-toxic substances.

To address the recommendation, the company should have at least one of the following in place:

a) Documented work practices, and/or recorded decisions, and rationales which demonstrate that alternatives to wood treated with CEPA-toxic substances have been considered prior to choosing construction materials for sensitive sites. In some cases, there may not be a practical alternative to wood treated with CEPA toxic substances. The company should record its decision.

b) Operating standards may be in place to limit or eliminate the use of wood treated with CEPA-toxic substances in particular sensitive areas.

c) Programs may be in place to actively review alternatives to wood treated with CEPA-toxic substances to determine if they are acceptable to be used near sensitive areas of concern to the company.

When conducting in-service re-treatment of treated wood in sensitive areas, the company should choose products that contain substances that are not CEPA-toxic as the first choice. Note that in some jurisdictions, in service re-treatment may require regulatory approval.

7.0 MANAGEMENT OF POST-USE TREATED WOOD

A *National Strategy for the Management of Post-Use Preservative Treated Industrial Wood (Konasewich et al., 2001)* was developed to inform the response to the recommendations of the SOP. This strategy was developed to provide guidance on minimizing the amount of used industrial treated wood going requiring disposal, and provides an overview of approaches for achieving this goal. Recommendations 6 through 8 draw on the information contained in this document, and a summary of the Strategy itself is provided in Section 7.4. It is recommended that Users consult all four of these sections for guidance in appropriate management of post-use treated wood.

7.1 Recommendation 6 – Encouraging re-use

Encourage the original user to re-use treated wood to the extent practicable, and where such reuse occurs, make every reasonable effort to manage the handling of that wood and any by-products (e.g., wood chips, saw dust, extracted preservatives) in a manner that prevents or minimizes:

a) Preservative being released to the environment; and
b) Risks to human health.

Companies may have widely differing practices with respect to the reuse of treated wood. Practices vary according to both the volume of wood re-used internally, as well as the task to which the treated wood is applied. Practicality may play a role in the volume that a company may reuse. Some companies will reuse treated wood for the same or similar uses while other companies may have procedures in place to remove the treated portion of the wood and use the remaining untreated portion of the wood for an entirely different use.

If companies are removing the treated portion of the wood then additional engineering and/or operational controls may be necessary to prevent/minimize the preservative from being released into the environment. Regulatory approval may be necessary prior to some types of reuse of the treated wood.

The way in which the treated wood is being reused, and how by-products are handled should be documented by the company.

Efforts have been made by some companies to extend the service life of existing inventories of treated wood. This can reduce the quantity of treated wood purchased on an annual basis. Efforts to extend the service life of treated wood can include, but not be limited to, groundline re-treatment and methods to inhibit internal decay. Extending the service life of treated wood may require the use of additional pest control products. First preference should be given to using registered pesticides that do not contain CEPA-toxic substances. In some jurisdictions, regulatory approval is required to apply a pest control product to extend the life of treated wood.

7.2 Recommendation 7 – Tracking post-use wood and educating users

Develop procedures to keep account of treated wood taken out of service. Whenever the transfer of possession of treated wood occurs, make every reasonable effort to include an advisory bulletin for the subsequent user that details:

a) That wood has been treated with a wood preservative; and
b) Any suggested management practices related to its future handling and use.

Companies should have some type of record keeping and/or procedures in place to reasonably account for used treated wood taken out of service and which cannot be reused for its original purpose. Record-keeping systems should include the bulletins given to subsequent users (if there is a place on the bulletin that records the number of pieces of treated wood transferred) and inventory retirement records. Companies should track the initial transfer of wood to another user. No tracking can be reasonably conducted for the transfer of treated wood from that user to any subsequent users.

The type of information given when transferring the possession of treated wood will vary from company and sector. However, some form of paper transfer of information is necessary to meet the intent of this recommendation (see Appendix VII for an example of a draft release form). The company should also keep records of the information given to subsequent users of the wood. The user should also be informed that, depending on the use, regulatory approval may be required by that user to reuse the wood in specific applications (e.g., near aquatic resources).

Suggested management practices to be included (but not limited to) in the transfer document are:

- Not using treated wood in residential interiors;
- Not using treated wood in situations where the preservative may become a component of food or animal feed (e.g., structures for storing silage or food) or bedding;
- Not using treated wood where it may come into contact with drinking water (e.g., wells, cisterns);
- Not burning treated wood; and
- Not using used treated wood in applications where structural integrity is important (unless certified by a qualified professional).

Note that the focus of the above paragraph is to eliminate the inappropriate reuse of treated wood manufactured for specific applications (e.g., utility poles, railway ties, etc.). As such, the suggested management practices are conservative. It is recognized that treated wood may be initially manufactured for some of these uses (e.g., CCA-treated wood foundations or treated wood used in aquatic applications).

When removal or replacement of treated wood structures is necessary, special care must be taken to minimize environmental disturbance (e.g., erosion and sedimentation, disturbance of vegetation, water crossings. Removal of some treated wood installations in remote locations (e.g., utility poles) is often conducted by cutting the wood at ground level and leaving the buried portion of the treated wood in the ground. This minimizes ground disturbance and associated environmental impacts associated with ground disturbances (e.g., siltation). Removal of piles in aquatic environments should be done using a slow, steady pull process to minimize disturbance of contaminated sediments. If the pile breaks off below the biologically-active sediment zone (i.e. the zone with adequate oxygen), it may be preferable to just leave the remainder of the pile, since digging it out may release large amounts of contaminated sediment. The removed treated wood must be reused or disposed of in the appropriate manner in accordance with applicable Provincial and Municipal laws.

7.3 Recommendation 8 – Using the Waste Management Hierarchy

When the user is disposing of treated wood, make every reasonable effort to utilize the recommended waste management hierarchy that includes reuse, recycle, recovery options for treated wood.

A generic hierarchy was developed on the basis of the Strategic Options report recommendations. The hierarchy is:

- Reuse (reused as is);
- Recycle (in the same type of application – e.g., posts rather than poles – minimal processing required);
- Product and/or Energy Recovery (processing required – chipping, shredding – material used in different application – e.g., composite board products);
- Landfilling.

Guidance for the disposal and management of post-use industrial treated wood is presented in Section 7.4.

In general, treated wood originally used in industrial applications should not be re-used in the residential market. This includes uses such as landscaping timbers, used railway ties, and garden furniture. Further, the re-use of treated wood should be avoided in products which may become building materials for residential homes where there is potential for exposure of the residents to the treatment chemicals. This caveat excludes the registered use of CCA treated plywood for wood foundations.

It should be noted that as CCA-treated wood is no longer commercially available to the residential market, CCA treated wood that was originally used in industrial applications should not be allowed to be reused in residential applications. The Pesticide Management Regulatory Agency (PMRA) has developed a fact sheet on CCA treated wood (residential) (http://www.hc-sc.gc.ca/pmra-arla/english/pdf/fact/fs_cca-e.pdf).

7.4 National Strategy for the Management of Post-Use Preservative Treated Industrial Wood (adapted from Konasewich et al., 2001)

A short-term objective of the SOP was to reduce the volume of used industrial treated wood going to landfill by 20% by the year 2005. To achieve this objective, guidelines for a National Strategy for the Management of Post-Use Preservative Treated Industrial Wood were developed through the Waste Management Working Group of the Industrial Treated Wood Users Implementation Steering Committee, a sub-group within the SOP. (See Appendix I for a reference to the complete document).

The guidelines for a National Strategy for the Management of Post-Use Preservative Treated Industrial Wood provides a review of available current approaches and technical options that are available for application to each component of a waste management hierarchy. This waste management hierarchy includes:

- Waste abatement or elimination;
- Waste reduction or modification;
- Waste reuse;
- Waste recycling;
- Waste treatment; and
- Waste disposal.

The guidelines also identifies obstacles to implementing the waste management hierarchy in the wood preservation sector, namely: regulatory; geographical; public perception; economics; cross border issues; and technology, and proposes a national management strategy for consideration by the Steering Committee.

The Waste Management Working Group is in the process of implementing the waste management strategy. This implementation strategy will be incorporated in future revisions of this document.

HIERARCHY OPTION 1: Abatement and/or Elimination

Abatement and/or elimination implies aspects such as means to minimize treated wood use, assessing alternative preservatives and construction materials and implementing measures to reduce the amounts of wood that may have to be disposed.

Implementing the abatement option, would imply the following measures:

- Assuring that wood is properly treated hence assuring that the expected lifetime is achieved;
- Assuring that the wood is not over-treated beyond levels that provide no additional effectiveness or that may cause the product to be prematurely rejected from use.

In order to achieve the abatement objectives, the industrial user of treated wood should refer to and specify recognized quality standards, such as the CSA, AWPA, ANSI, and BMP's, during the procurement of treated products.

HIERARCHY OPTION 2: Reduction

Maximizing the service life of treated wood will result in reduced generation of treated wood waste for future disposal.

Reduction Practices

In Canada, procedures for prolonging the life of a treated product, and hence reduce the overall volumes of treated wood requiring disposal, include:

- Application of manufacturing procedures to ensure the best possible performance of preservative treated products. These include:
  - Pre-treatment processes such as drying and incising of wood to achieve deeper preservative penetration;
  - Sizing, shaping and boring of products prior to treatment to minimize less effective field preservation techniques; and
  - Quality management techniques to ensure proper preservative penetration and retention.

- Application of service life enhancing techniques such as:
  - Fitting railway ties and poles with anti-splitting devices that reduce the wood's tendency to develop deep checks beyond the treated zone;
  - Application of larger rail bearing plates to reduce the mechanical damage of railway ties.

- In-situ application of service life extending technologies such as ground-line treatments of utility poles.

HIERARCHY OPTION 3: Reuse

Reuse of treated wood removed from its initial point of service implies its application at another point of service in its original form.

Reuse of Railway Ties

Used railway ties are generally collected, sorted and graded by contractors before being sold by brokers into applications such as landscaping. The used ties with no potential for reuse as "ties" may then be disposed of as fuel for a co-generation facility, or landfilled.

Reuse of Utility Poles

Used utility poles are generally collected by Utility companies before being sorted and evaluated for potential reuse as poles, posts, braces, stubs and anchors.

Reuse of Other Types of Treated Wood
Other types of treated wood (e.g., bridge material, fence posts) can be reused as well. Depending on the company, there may be several mechanisms for how this wood gets reused – via contractors or directly by the facility.

HIERARCHY OPTION 4: Recycling

The preferable recycling option for used treated wood is the recovery of solid wood. Subsequent recycling options include fibre recovery and energy production.

Recycling into Wood Products
There are currently three facilities in Canada (BC Wood Recycling Ltd., Surrey, BC; Northern Pressure Treated Wood Ltd., Kirkland Lake, ON; and Tred'si Inc., Westbury, QC) that are involved in the conversion of utility poles into lumber and timber products. All three facilities handle only creosote and PCP treated poles. The recovered lumber and timber products are manufactured into landscaping products, garden furniture, and fencing. The outside treated portions of wood are cut from the poles and disposed of in landfill sites or shipped to co-generation facilities in the United States.

Recycling as Fibre
There is currently one facility in Canada (Innovative Recycling Inc., Enoch, AB) that mixes chipped treated wood with other waste wood fibre in order to make a heavy dry felt paper product which is then used as a base for asphalt roofing shingles. This facility only handles PCP treated poles, and it is suggested that the process would not be a major user of waste treated wood.

Recycling as Energy
In Canada, there are currently two types of technology available for recycling post-use treated wood as energy: industrial boilers and co-generation facilities; and cement kilns. Users of industrial treated wood should work with facilities capable of recycling post-use treated wood as energy to thus reduce the amount of treated wood sent to landfills.

Industrial Boilers and Co-Generation Facilities
There are currently two pulp and paper facilities in Canada (Intercontinental Pulp Mill (Canfor), Prince George, BC; and Kruger Inc., Trois-Rivières, QC) that have regulatory permits to use treated wood as supplementary fuel in their industrial boiler systems. The Canfor facility has permits for both creosote and PCP treated wood, while the Kruger facility will only accept creosote treated wood.

There are two co-generation facilities in British Columbia (Northwest Energy, Williams Lake, BC; and Lytton Power, Lytton, BC) that have permits to use treated wood as supplementary fuel in their co-generation units. Both facilities only accept creosote treated wood.

Three of 12 boiler and co-generation facilities in the United States are known to accept treated wood from Canada as a supplementary fuel source. The Koppers Incineration System facility, located in Muncy, PA, and the Viking Energy co-generation facility, located in McBain, MI, only accepts creosote treated wood. Another Viking Energy co-generation facility, located in Lincoln, MI, accepts both creosote and PCP treated wood.

Cement Kilns

There is currently one cement kiln in Canada (St. Lawrence Cement Inc., Joliette, QC) that has a permit to use treated wood as a fuel for the manufacture of portland cement. The manufacturing process is capable of accepting unlimited amounts of creosote and PCP treated wood, and restricted amounts of CCA treated wood. However, St. Lawrence cement has not received any post-use treated wood to date probably because of the costs associated with reducing the railway ties and poles to the particle size (coarse sawdust) required for the kilns.

HIERARCHY OPTION 5: Treatment

Hazardous waste incinerators are present in Alberta, Ontario and Quebec. These incinerators are constructed to destroy a wide range of hazardous wastes including PCBs, and are thus expensive to construct and operate. The treatment option for post-use treated wood precludes any recovery of energy, fibre or wood preservation chemicals, and does not support the concept of sustainable development.

HIERARCHY OPTION 6: Disposal

During the year 2000, approximately 12% of railway ties and 13% of utility poles that were taken out of service were disposed of in landfills throughout Canada. With the exception of utility poles from Hydro Quebec, it appears that almost all non-recyclable and non-reusable post-use CCA, creosote and PCP treated wood are disposed of in landfills.

A summary of some of the costs associated with waste management options for post-use treated wood in Canada is shown in Table 7.

Table 7: Summary of Costs Associated with Current Waste Management Options for Post-Use Treated Wood in Canada.

Process Item	**Process Cost (Year 2000 Cdn $)**
Transportation	$0.03-$0.04/ton mile
Sorting & Preparation	
Ties	$0.75/tie (including spike and plate removal)
Poles	
Shredding	$1.50/tie
Reuse	Not quantified. Would be a net benefit
Recycling	
Poles as timbers	$18-$20/pole
Creosote wood for co-generation	Revenue from 0-$19/ton (pre-chipped)
PCP wood for co-generation	$15/ton (pre-chipped)
Chemical Extraction	$310/tonne for CCA
Treatment - Hazardous waste incineration	$200-$1000/ton
Landfill	$14-$100/ton

8.0 AUDITS, RECORDS, AWARENESS/TRAINING

8.1 Recommendation 9 – Continuous Improvement of Practices

Make every effort to continually improve the handling and management practices of treated wood

This should be a basic objective of the company, and should form the basis of any treated wood management components as well. The continual improvement component of an environmental management system is addressed by requiring regular reviews and audits.

8.2 Audits

It is important for a company to verify, identify and resolve deficiencies in their environmental management program. To accomplish this, the Guideline Development Working Group of the Industrial Treated Wood Users Implementation Steering Committee has developed auditing protocols to help the company establish whether or not the requirements of each recommendation are being satisfied. These auditing protocols are presented in Appendix VIII of this document.

Periodic environmental management systems audits will establish whether or not all the requirements of the environmental management program are being carried out in an appropriate manner. To be effective an environmental management systems audit program should include (CSA-ISO 19011, *Guidelines for Quality and/or Environmental Management Systems Auditing*):

- Development of audit procedures;
- Establishment of appropriate audit frequency;
- Training of auditors;
- Maintenance of audit records.

8.3 Records

Documents required to be retained by the company shall demonstrate that each recommendation has been implemented by the company. The records management system will vary with different companies, however, in general, records should be accurate, legible, identifiable and traceable to the activities, products or services involved during the implementation of the recommendations. Records should also be stored and maintained in such a way that they are easily retrievable and protected against damage, deterioration or loss (CSA-ISO 14001, *Environmental Management Systems: Specification with Guidance for use,* 1996).

One additional consideration may be that records should be in sufficient detail so that an outside person could reasonably determine that the company has addressed the recommendations.

8.4 Awareness and Training

When implementing the recommendations, it is essential that the company have a management system in place that would show that applicable personnel are aware of the necessary documentation to apply the recommendations appropriately.

In general, roles and responsibilities should be defined, documented and communicated to make certain that the commitments set forth in these recommendations are addressed at all relevant levels of the organization (CSA-ISO 14001, *Environmental Management Systems: Specification with Guidance for use*, 1996).

Training needs are to be established by individual companies based on applicable requirements. Formal training is not required, however, the company personnel who are associated with the management of wood treated with CEPA-toxic substances should be aware of what their roles and responsibilities are in addressing the recommendations.

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APPENDIX I

INFORMATION PREPARED FOR THE INDUSTRIAL TREATED WOOD USERS STEERING COMMITTEE

INFORMATION PREPARED FOR THE INDUSTRIAL TREATED WOOD USERS STEERING COMMITTEE

The following technical reports were prepared for the Industrial Treated Wood Users Steering Committee to assist in the completion of the Users Guidance Document. For more information contact Curtis Englot, Environment Canada at (780) 951-8873 or curtis.englot@ec.gc.ca.

Earth Tech (Canada) Inc., and EcoBec 2000 Inc. 2002. *Guidelines for Treated Wood Storage Facilities*. Report for Guidelines Development Working Group Industrial Treated Wood Users Implementation Steering Committee. Environment Canada. — Edmonton, AB.

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APPENDIX II

SOP RECOMMENDATIONS FOR IN-SERVICE AND POST USE TREATED WOOD

RECOMMENDATIONS FOR INDUSTRIAL IN-SERVICE USE AND POST-USE OF TREATED WOOD[5]

These recommendations have been developed to address the release of CEPA-toxic substances from industrial treated wood while in service and when taken out of service. Industrial users include the railways, electricity industry, telecommunications industry and government highway and roads departments. This set of recommendations describe a comprehensive continuous improvement program anticipated to result in reductions of releases of CEPA-toxic substances: arsenic, chromium (VI), polychlorinated dioxins and furans, hexachlorobenzene, polyaromatic hydrocarbons and creosote impregnated waste material. An immediate benefit of implementing the recommendations is the implementation of a consistent approach to the management of industrial treated wood both in-service and when taken out of service. The goal for the future ensures the users will continue to use treated wood in a manner that is better for the environment. The industrial users will continue to actively seek alternative products and to assess their impact on the environment throughout their entire lifecycle (production to disposal). While a draft guidance document for developing an environmental management system for industrial treated wood was compiled by the Issue Table, it was the Issue Table's intent that a comprehensive review of the document be conducted before publication and use by the industry.

Steering Committee

D1. It is recommended that a steering committee made up of representatives from industry, federal and provincial governments, non-government environmental group(s), and other key stakeholders be convened to oversee the implementation of these recommendations. The steering committee will meet at least annually and will be responsible for assigning priorities for studies and programs, accessing funds and support from other appropriate parties and implementing the recommendations as outlined. The steering committee will ensure that implementation costs are equitably shared amongst responsible stakeholders. The terms of reference for the steering committee have been drafted and are appended to this document.

Steering Committee Role

D2. It is recommended that the steering committee undertake the following:

(a) Facilitate the development of guidance with respect to:

- Industrial User Treated Wood Management System (UGD);
- Auditing Procedures;
- Evaluation Tools.

(b) Identify and work to fill data gaps. For example the following were identified by the SOP Issue Table:

- Creosote rail tie impact assessment (fate/effect of released/lost PAHs);
- Fate and Impact of arsenic releases from treated wood.

(Note: The Issue Table concluded that sufficient information was available on dioxin/furan and hexachlorobenzene released from poles.)

5 This is the text from the Strategic Options Report (July 1999). In some areas the deadlines for completing the work have passed. Revised deadlines will be developed by the Industrial Treated Wood Users Steering Committee as part of the implementation strategy for this User Guidance Document.

(c) Facilitate the development of technical guidance. For example the Issue Table identified the following requirements:

- Development of guidelines for Siting, Design, Management, Operation, and Monitoring of Treated Wood Storage Facilities;
- Compiling the existing guidelines for specifying treated wood products (will reference appropriate specifications including the CSA Standards, aquatic BMPs and TRDs);
- Development of Lifecycle Analysis Methodology for treated wood products and their alternatives;
- Providing information to users that would allow responsible decision making for treated wood application selection, lifecycle analysis comparisons, siting recommendations, impact mitigation or monitoring requirements.

(d) Develop and deliver an outreach program. The outreach program will serve to outline the program and describe available guidance to industrial users and will solicit commitment from individual companies.

(e) Review and evaluate progress of the program in 2006; taking into consideration percent of industry participating (implementation and reporting), percent of "compliance" attained and the trends observed.

(f) Publication of a report in 2006 summarizing the progress made by the industrial users and the effectiveness of the program. The report will also make recommendations for the continued management of treated wood.

Environment Management System

D3. It is recommended that individual industrial user companies undertake the following:

(a) develop a treated wood management system by the end of 2000;
(b) implement the management system by the end of 2002;
(c) conduct a first self audit and interim progress report by end of 2003;
(d) conduct a third-party audit and public report by end of 2005;
(e) continue to evaluate alternatives that minimize the impact on the environment (i.e. release of toxic substances).

Public reporting should outline the progress made towards implementing an environmental management system for treated wood including the track one and track two substances in treated wood (As, Cr (VI), PAHs, PCDD, PCDF and hexachlorobenzene) that are:

- purchased annually; and
- removed from service annually;

and including:

- estimated releases from in-service treated wood during the reporting year; and
- tracking and documenting out of service treated wood material (% to landfill, % to reuse, % to recycle, etc.).

The form of the public reporting can be via company annual reports, company environmental reports, industry sector reports or posted on company Internet sites.

Alternative Wood Preservatives and Materials

D4. It is recommended that the Steering Committee facilitate the exchange of information and the building of partnerships for lifecycle assessment and analysis of alternative materials and wood preservative chemicals.

Waste Management Strategy

D5. It is recommended that the steering committee facilitate the development of an Industrial Treated Wood Waste Management Strategy and make recommendations regarding its implementation to include:

- establishment of a waste management hierarchy for treated wood (including: recycle, reuse, energy recovery, landfill);
- a review of technical options;
- identification of obstacles as well as means to address those obstacles including (but not limited to):
  - regulatory;
  - geographical;
  - public perception;
  - economics;
  - cross-border issues(provincial/federal);
  - technology.

In the interim it is recommended that industrial treated wood users as a group commit to reducing the volume of material going to landfill by 20% by the end of 2005 (based on baseline data from 1990 if available; more recent data should be used if 1990 data are not available). Future targets will be developed as part of the wood waste management strategy.

APPENDIX III

CEPA TOXIC RELEASE ESTIMATES FROM TREATED WOOD IN-SERVICE

AND

QUANTITIES OF CEPA TOXIC SUBSTANCES IN POST USE TREATED WOOD

Table 1A: Estimated Losses of Chromium (VI) and Arsenic from Treated Wood In-Service* (adapted from Environment Canada Strategic Options Report, 1999a).

Product	Wood in Use ($x10^6$ m^3)	Chemical Initially In Wood ($x10^3$ kg)		Chemical Losses to Soil/Water/Sediments ($x10^3$ kg/year)	
		Cr^{VI}	As	Cr^{VI}	As
Residential Construction	19**	0	9,595	0	48.0
Poles	1.91**	0	3,700	0	12.4
PWF (Permanent Wood Foundations)	0.76	0	1,430	0	negligible
Marine Piling	0.02	0	183	0	0.4
Other Products	0.88	0	1,140	0	3.8
Total	**22.57**		**16,048**		**64.6**

* based on best available data to date
** increasing

Table 1B: Estimated Quantities of Chromium (VI) and Arsenic from Treated Wood Disposal* (adapted from Environment Canada Strategic Options Report, 1999a).

Product	Wood Removed in 1995 ($x10^3$ m^3)	Chemical in Wood Removed (kg/year)		Landfilled (kg/year)		Recycled/ Reused (kg/year)	
		Cr^{VI}	As	Cr^{VI}	As	Cr^{VI}	As
Residential Construction	102**	0	46,360	0	46,360	0	0
Poles	54**	0	94,245	0	9,425	0	84,820
Commercial/Industrial	11.3	0	13,150	0	11,835	0	1,315
Posts	11.3	0	13,150	0	11,835	0	1,315
Other Products	2.8	0	3,260	0	2,930	0	330
Total	**181.4**		**170,165**		**82,385**		**87,780**

* based on best available data to date
** increasing

Table 2A: Estimated PAH Losses from Creosote Treated Wood In-Service (adapted from Environment Canada Strategic Options Report, 1999a).

In-Service Use			Wood in Use (#)	PAH In Use (10^6 kg)*	PAH Loss (10^6 kg/year)*
Rail Ties		- in service	100,000,000	210 – 336	
		- new (annually)	1,400,000		1.2 – 3.0
Utility Poles	- Full Treat	- in service	700,000	33 – 52	
		- new (annually)	0		0
	- Butt Treat	- in service	1,200,000	4.0 – 6.4	
		- new (annually)	100		<0.0002
Timbers	- Marine	- in service	1,200,000 m^3	141 – 226	
		- new (annually)	14,480 m^3		0.7 – 1.7
	- Land/Bridge	- in service	425,000 m^3	20 – 32	
		- new (annually)	20,160 m^3		0.36 – 0.9
Remedial Treatment					
Total				**408 - 652**	**2.3 – 5.6**

* Based on a range of estimated losses of between 20-50% of the initial creosote loading over lifetime of the treated wood. (From Cooper, P. et al 1989 and 1994)

Table 2B: Estimated PAH from Creosote Treated Wood Disposal (adapted from Environment Canada Strategic Options Report, 1999a).

Disposal		Wood Removed (#)	PAH Removed (10^6 kg/year)*	PAH Landfilled (10^6 kg/year)*	PAH Recycled (10^6 kg/year)*
Rail Ties		1,400,000	2.9 – 4.6	1.2 – 1.9	1.7 – 2.7
Poles		12,350	0.30 – 0.50	0.19 – 0.30	0.11 – 0.18
Timbers	**- Marine**	2,830 m^3	0.42 – 0.68	0.31 – 0.50	0.11 – 0.18
	- Land	7,930 m^3	0.36 – 0.58	0.27 – 0.43	0.09 – 0.14
Total			**4.0 – 6.4**	**2.0 – 3.1**	**2.0 – 3.2**

* Based on a range of estimated losses of between 20-50% of the initial creosote loading over lifetime of the treated wood. (From Cooper, P. et al. 1989 and 1994).

Table 3A: Estimated Dioxin/Furan and Hexachlorobenzene Releases to Air and Soil from Pentachlorophenol Treated Wood In-Service (adapted from Environment Canada Strategic Options Report, 1999a).

Product	Year Produced	Release to Air (g/year)				Release to Soil (g/year)			
		HCB		D/F TEQ		HCB		D/F TEQ	
		Per Pole/Tie	Total	Per Pole/Tie	Total	Per Pole/Tie	Total	Per Pole/Tie	Total
Utility Poles (6.8 million)	Post 1987 (20%)	$3.3x10^{-4}$	446	$7.8x10^{-9}$	0.01	$1.5x10^{-5}$	100	1.3×10^{-6}	9.0
	Pre 1987 (80%)	$3.3x10^{-4}$	1784	$3.5x10^{-7}$	1.89	$1.5x10^{-5}$		1.3×10^{-6}	
Railway Ties ($70,000 m^3$)	Pre 1987 (100%)					$5.0x10^{-5}$	35.1	4.4×10^{-7}	0.31

Table 3B: Estimated Dioxin/Furan and Hexachlorobenzene Landfilled with Pentachlorophenol Treated Wood Taken Out-of-Service (adapted from Environment Canada Strategic Options Report, 1999a).

Landfilled Out-of-Service Wood	Quantity	Landfilled Contaminant Concentration (g/year)	
		HCB	D/F TEQ
Utility Poles	4,994 poles	589.0	31.4
Railway Ties	$287 m^3$	54.5	4.4

APPENDIX IV

ACTIVITIES OF THE TREATERS AND MANUFACTURERS STEERING COMMITTEE

ACTIVITIES OF THE TREATERS AND MANUFACTURERS STEERING COMMITTEE

In 1984, Environment Canada, as part of a federal strategy to protect the environment and human health from potentially toxic commercial chemicals, evaluated use practices within the wood preservation industry. The department subsequently initiated a technical steering committee to develop technical recommendations for facility design and operations.

The objectives were to develop recommendations that would outline practices to:

- Reduce or eliminate the release of wood preservative chemicals to the environment;
- Minimize the exposure of workers to wood preservative chemicals.

The development process, which included the participation of representatives from federal and provincial government agencies, the wood preservation industry, forest industry labour unions, and workers' compensation boards, concluded with the publication of five technical recommendations documents (TRDs) in 1988 (1, 2, 3, 4, 5). The documents covered good practices for pressure treatment with each of the major wood preservatives then in use: chromated copper arsenate (CCA), ammoniacal copper arsenate (ACA), pressure treatment with pentachlorophenol (PCPP), thermal treatment with pentachlorophenol (PCPT) and creosote. These documents have since been widely applied in Canada to the construction of new facilities and the upgrading of existing wood preservation plants. In addition, international technical guide documents for the preservation industry have made use of information contained in the Canadian TRDs from 1988 (6, 7).

The measures recommended in the 1988 TRDs were based on knowledge of the existing technology and the properties of the preservative chemicals at the time of their development. However, since the publication of the 1988 TRDs, a variety of new and modified operating technologies have been developed, environmental compliance criteria have changed, and knowledge of the properties of the chemicals has been expanded. Hence, it was deemed necessary to review the TRDs, update information where appropriate, and include any new technologies to take advantage of improved design and operational practices.

In response to the need to update the 1988 TRDs, Environment Canada and the Canadian Institute of Treated Wood (CITW) initiated development of a single revised TRD, which was published in March 1999(8). A review of the 1988 TRDs was organized by CITW and was undertaken by industry members. The industry comments were compiled by Frido Consulting. Relevant industry information, as well as additional information from the open literature or from experts and regulatory agencies, was also used to update the recommendations. The document underwent four draft stages, each entailing reviews and comments by industry, as well as federal and provincial regulatory personnel. It was finalized by a technical coordinating committee.

As indicated above, the 1988 recommendations were presented in five comprehensive documents. These have been found to be user-friendly in format and general content. However, there were many subjects and recommendations common to all, leading to duplication. To eliminate such duplication, the 1999 TRD included all preservatives and treatments in a single manual. Although the 1999 manual followed the contents and format of the 1988 TRDs as closely as possible, general background information and recommendations applicable to all preservatives were separated from information specific to individual preservatives. This structure made information about individual preservatives easier to find and facilitates additions of new preservatives and any other incidental information.

Following publication of the 1999 manual (1999 TRD), the working group proceeded with a voluntary program to implement the recommendations at all wood preservation facilities in Canada. The goal of the program is to have all facilities conform with the intention of the TRD by 2005. To meet this goal, the TRD Implementation Program was developed with the following steps:

- two rounds of information sessions were held across Canada to inform wood preservation facilities about the program;
- a baseline assessment, referred to as Assessment 2000, was conducted at every facility to determine conformance with the TRD;
- each facility was required to submit an implementation plan by Dec. 31, 2001, which would describe how it intended to correct deficiencies from Assessment 2000;
- on Dec. 31 of years 2002 to 2005 inclusive, facilities are required to submit annual update reports to demonstrate continual improvement towards the 2005 goal;
- random audits are conducted to determine whether the work conducted at facilities meets the intention of the TRD.

The results of Assessment 2000 indicate that average overall conformance levels were 65% for CCA (range 32-90%); 69% for CREO (range 60-79%); 68% for PCP (range 36-93%); and 78% for PCPT facilities. In 2001, 65 of the 66 facilities submitted implementation plans. As of 2002, 2 plants indicated that they were compliant and 7 indicated that they were very near 100% compliant. The overall compliance level increased from 65% to approximately 80% in 2002. However, there were 11 facilities whose progress was deemed as inadequate. Preliminary results from 2003 annual reports indicate significant progress by a large number of facilities and some that continue to lag. Those facilities that don't make adequate progress towards compliance by 2005 will be subjected to the Pollution Prevention provisions under CEPA 1999.

As the implementation program has unfolded, it has generated questions and additional knowledge regarding Best Management Practices. As a result, the 1999 TRD was revised and a 2004 version was published.

The 2004 updated manual, which maintains the format and content of the 1999 version, is meant to provide necessary information on the physico–chemical properties of the industrial wood preservatives. It includes new chapters on the preservatives alkaline copper quaternary (ACQ), copper azole (CA-B) and inorganic boron, which are newly registered in Canada. Ammoniacal copper arsenate" (ACA) has been replaced by the new preservative "ammoniacal copper zinc arsenate" (ACZA). As well, it contains design and operational measures to enable safe operations in wood preservation facilities in terms of worker exposure and health risks as well as environmental impact.

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APPENDIX V

LISTING OF REGISTERED WOOD PRESERVATIVES

REGISTERED HEAVY DUTY WOOD PRESERVATIVES* AS OF JUNE 16, 2004 FOR PRESSURE TREATMENT

Preservatives require registration under the Pest Control Products Act. Always check with the Pest Management Regulatory Agency (PMRA) to obtain current registration status (1-800-267-6315 or www.eddenet.pmra-arla.gc.ca/4.0/4.01.asp).

Active Ingredient	PCP #	Product Name	Uses and Limitations*
ammoniacal copper zinc arsenate**	25809	Chemonite (Ammoniacal Copper Zinc Arsenate - ACZA) Wood Preservative	**Limitations:** Working solutions should only be used for treatment of wood that, in service, will have NO opportunities for the following: - having direct contact with or becoming a - deleterious component of drinking water - use in food/feed storage/production or where the preservative may become a deleterious component of food or animal feed
chromated copper arsenate**	13707	Timber Specialties K-33 (72%) Wood Preservative	**Uses:** 1) land, fresh water, foundation and marine piles 2) poles for highway and utility uses 3) plywood 4) wood for highway construction: lumber for bridges and structural members; lumber for cribbing, culverts and bridge parts; land, fresh water and salt water piles; structural lumber in salt water; posts (fence, guard rail, guide, sign and sight); lighting poles; bridge hand rails, guardrails and posts 5) fence posts and poles for use on farms, piles and posts used as structural members on farms, and plywood used on farms 6) wood for marine construction (salt water immersion) 7) round poles and posts used in building construction 8) sawn crossarms 9) laminations before gluing 10) shakes and shingles 11) lumber and plywood for permanent wood foundation
	14025	Timber Specialties K-33 (C-72) Wood Preservative	
	14026	Timber Specialties K-33 (C-50) Wood Preservative	
	19612	Timber Specialties K-33 (C-60) Wood Preservative	

Active Ingredient	PCP #	Product Name	Uses and Limitations*
	21226	Wolmanac 60% Concentrate Wood Preservative	
	27368	CCA Type-C (60%) Wood Preservative - Commercial Use	
creosote**	19860	Carbochem Coal Tar Creosote (P2) Wood Preservative	**Uses:** 1) railway ties 2) utility poles, and piling 3) outdoor construction materials **Limitations:** treated wood should have no opportunity for: - direct contact with, or where it may become a deleterious component of drinking water - use in: - residential construction - food/feed storage/production or animal housing - playground equipment - frequent or prolonged skin contact
	19861	Coal Tar Creosote (P-1/P13) Wood Preservative	
pentachlorophenol**	21785	Vulcan Glazd Penta Tech. Grade Pentachlorophenol	**Uses:** 1) railway ties 2) utility poles, and piling 3) outdoor construction materials **Limitations:** treated wood should have no opportunity for: - direct contact with, or where it may become a deleterious component of drinking water - use in: - residential construction - food/feed storage/production or animal housing - playground equipment - frequent or prolonged skin contact
	22024	Vulcan Block Penta Technical Grade Pentachlorophenol	
	26110	Pentacon-40	

* Heavy duty wood preservatives include those products which are applied under pressure or are applied thermally.

** As of June 16, 2004, chromated copper arsenate, creosote and pentachlorophenol are under re-evaluation as announced in the Agriculture Canada A92-02 document *Re-evaluation of Heavy Duty Wood Preservatives*. Ammoniacal copper zinc arsenate was subsequently added to the re-evaluation (June, 2003). Registration status and uses may be changed as a result of the re-evaluation.

Contact the PMRA (1-800-267-6315, www.eddenet.pmra-arla.gc.ca/4.0/4.01.asp) for information on the current regulatory status and acceptable uses.

APPENDIX VI

CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT SOIL QUALITY GUIDELINES

Table 4A: Recommended Soil Quality Guidelines (CCME, March 1997)

Parameter (mg/kg)	Land Use			
	Agricultural	**Residential/Parkland**	**Commercial**	**Industrial**
Inorganic Arsenic	12	12	12	12
Total Chromium	64	64	87	87
Chromium (VI)	0.4	0.4	1.4[3]	1.4[3]
Naphthalene[1]	0.1	0.6	22	22
Pentachlorophenol[2]	7.6	7.6	7.6	7.6

1 There were no limits established for total PAHs so Naphthalene is used as a surrogate.
2 There were no limits for polychlorinated dibenzodioxins, polychlorinated dibenzofurans, or hexachlorobenzene so pentachlorophenol is used as a surrogate.
3 Revised 1999

From: *Recommended Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health.* Canadian Council of Ministers of the Environment. March 1997.

APPENDIX VII

DRAFT RELEASE FORM FOR POST-USE TREATED UTILITY POLES

RELEASE FORM FOR REUSING TREATED WOOD POLES – D R A F T

Treated Wood Poles

Information Document

General

Chromated Copper Arsenate (CCA), Pentachlorophenol (Penta), and Creosote are authorized wood preservatives in use today. Current scientific literature however, points to certain health and environment dangers linked to these preservatives.

Depending on the residual concentrations of preservatives in the wood, small amounts can impact the ground adjacent to the poles. When used as fuel in home fireplaces, stoves and furnaces, or in open-air fires, the wood does not burn completely and can create toxic by-products or toxic residues. Moreover, frequent contact with skin, can cause itching, while contact with the eyes can result in irritation.

Prohibited Uses

Consequently, the following uses are prohibited:

- Fuel (Fireplaces, furnaces, open-air fires, etc.);
- Construction material in water (docks, cribs, walls, etc.);
- Construction material with which people come into direct and frequent contact (i.e. children's toys, playgrounds, patios, balconies, vegetable garden cribs, home interiors, etc.);
- Construction material with which livestock or crops come into direct and frequent contact (i.e. feed troughs, stalls, etc.).

Handling Precautions

To avoid possible eye and skin irritation, certain basic precautions must be taken when handling these materials:

- Wear clothes that cover the entire body:
  - long pants;
  - long sleeved shirt;
  - gloves;
  - safety glasses.
- Avoid contact with eyes or face.

RELEASE FORM FOR REUSING TREATED WOOD POLES – D R A F T

Treated Wood Poles

Information Document

Date: _____/_____/_____ **Number of poles donated**: _____
y m d

Receiver: _____

Use for: _____

Receiver's Address: _____

_____

_____

The receiver has read and is aware of the restrictions on treated wood and of the necessary handling precautions indicated on the back of this form, and agrees not to use the treated wood for prohibited uses.

The receiver shall not dispose of the treated wood to third parties without fully informing the third party of the hazards, prohibited uses and handling precautions outlined herein and shall indemnify ____ Company against any claims made against ____ Company by such third parties as a result of the receiver's failing to do so.

Furthermore, the receiver shall not hold ____ Company responsible for any damage, injury or other claims resulting from the handling, transport or use of the items mentioned on this document:

Signatures:

_____ _____

Company Representative **Receiver**

APPENDIX VIII

AUDITING PROTOCOLS FOR THE USER GUIDANCE DOCUMENT

AUDITING PROTOCOLS FOR THE USER GUIDANCE DOCUMENT

The User Guidance Document contains nine recommendations for the appropriate management of treated wood by industrial users from purchase through to disposal. These auditing protocols contain a series of areas that an auditor can investigate to determine how closely a facility's operations align with the intent of the recommendations outlined in the UGD.

The intent of these protocols is for users and independent verifiers to determine whether the systems put in place to meet the recommendations are sufficient. The auditor will determine, based on these protocols whether gaps exist or not.

These protocols can be used by company personnel or third party auditors.

	Check box when item complete
A. RECOMMENDATION 1 – Use purchasing policies that make certain any treated wood purchased has been treated appropriately.	
1. Determine what purchasing policies the company/facility has. Are these policies documented? Determine the revision frequency.	☐
2. Do these policies cover all types of treated wood purchased by the company/facility? Note any exceptions.	☐
3. Are people involved in the purchasing of treated wood aware of these policies?	☐
4. Determine how the company/facility monitors treated wood purchases to make certain that the treated wood specifications conform to the purchasing policies.	☐
Comments: _____	
B. RECOMMENDATION 2 – Address potential impacts appropriately in locating storage facilities for treated wood.	
1. Review the facility's/company's procedure(s) for the siting of new storage locations for treated wood. Do/does the procedure(s) clearly show that potential impacts to the environment are considered in the siting process for storage facilities?	☐
2. Have the intent of the requirements for siting and design referenced in "Guidelines for Treated Wood Storage Facilities" been met. Note any exceptions.	☐
3. Assess whether all appropriate environmental impacts have been considered and discussed in the siting procedure.	☐
4. Are personnel involved in siting new storage facilities aware of the procedures? Review, if possible, any recently developed storage facilities for treated wood. Were the documented procedures followed?	☐

	Check box when item complete
5. Are company/facility personnel aware of any regulatory requirements for the siting of new storage facilities for treated wood?	☐
Comments: _____	
C. RECOMMENDATION 3 – Address potential impacts appropriately in managing storage facilities for treated wood.	
1. Review company/facility documentation describing how treated wood storage sites are managed. Assess whether all potential impacts have been considered.	☐
2. Have the intent of the requirements for operation and maintenance referenced in "Guidelines for Treated Wood Storage Facilities" been met? Note any exceptions.	☐
3. Determine if company/facility personnel are aware of these requirements? Are commitments made in the documentation being adhered to by personnel?	☐
4. Determine if regulatory approval is required for the storage facility. Are personnel aware of any requirements outlined in the regulatory approval?	☐
5. Determine what operational practices are in place to mitigate any potential environmental impacts from storage facilities. Are operating personnel aware of these procedures? Assess whether the procedures are appropriate by inspecting storage facilities and determining if potential environmental impacts have been mitigated or managed in a reasonable manner.	☐
6. Has the company conducted any assessments to determine if CEPA-toxic materials were located outside the boundaries of the storage site? If so, review the results and determine if appropriate action was taken.	☐
7. For temporary storage areas, determine how the areas is assessed for visual environmental impacts once the treated wood has been removed. Have any temporary storage facilities had to be remediated?	☐
Comments: _____	
D. RECOMMENDATION 4 – Install treated wood in a manner that appropriately considers potential environmental impacts and the health and safety of the general public.	
1. Review the company/facility documentation describing how treated wood is to be installed. Are potential environmental impacts appropriately considered in the documentation?	☐
2. Review the company/facility documentation describing how treated wood is to be installed. Are potential environmental impacts appropriately considered in the documentation?	☐

	Check box when item complete
3. If possible, observe treated wood installation. Are practices consistent with the written documentation?	☐
4. If possible, observe sites where treated wood has been recently installed. Has construction debris been removed? Determine how the company/facility disposes of this material. Assess the treated wood installation with respect to general housekeeping and consideration of the environment.	☐
Comments: _____	
E. RECOMMENDATION 5 – Consider, where practicable, alternatives to the use and in-service retreatment of wood treated with CEPA-toxic substances in areas that may be sensitive in terms of the environment and human health, such as areas in close proximity to potable water supplies and aquatic resources.	
1. Determine what the company/facility considers to be a "sensitive site". Is this documented? Is the definition consistent among company/facility employees?	☐
2. Determine how the facility considers alternatives to wood treated with CEPA-toxic substances for use in sensitive sites. Note what alternatives, if any, have been used.	☐
3. Determine if there are regulatory constraints for placing wood treated with CEPA-toxic substances in particular sites. Are company/facility personnel aware of these restrictions?	☐
4. When using wood treated with CEPA-toxic substances in sensitive sites, are any precautions taken to prevent CEPA-toxic substances from entering the environment?	☐
5. Does the company/facility conduct in-service re-treatment of treated wood? Are alternatives to CEPA-toxic substances used? Note any exceptions.	☐
6. Determine if regulatory approval is required to apply a re-treatment product to treated wood. Are company/facility personnel aware of this requirement? Are requirements in regulatory approvals being adhered to? If contractors are conducting this work, how does the company/facility make certain that contractors are aware of appropriate requirements?	☐
Comments: _____	

	Check box when item complete
F. RECOMMENDATION 6 – Encourage the original user to re-use treated wood to the extent practicable, and where such reuse occurs, make every reasonable effort to manage the handling of that wood and any by-products (e.g., wood chips, sawdust, extracted preservatives) in the manner that prevents or minimizes: • **Preservative being released to the environment; and** • **Risks to human health.**	
1. Determine the fate of treated wood taken out of service. Is this documented?	☐
2. Have practices for the reuse of treated wood been documented?	☐
3. If the company/facility is not reusing the treated wood for its original use, what practices are in place to make certain that treated wood is being used appropriately.	☐
4. If the facility is processing the treated wood (e.g., shaving off treated sections; sawing wood), determine how the by-products are handled. Is this process documented?	☐
5. Determine if the processing of the treated wood requires regulatory approval. Are facility personnel aware of the requirements of the approval? Are requirements of the approval being met?	☐
6. If a contractor or other outside party is processing the treated wood, how has the company/facility made certain that the treated wood is being handled appropriately?	☐
Comments: _____	
G. RECOMMENDATION 7 – Develop procedures to keep account of treated wood taken out of service. Whenever the transfer of possession of treated wood occurs, make every reasonable effort to include an advisory bulletin for the subsequent user that details: • **That wood has been treated with a wood preservative; and** • **Any suggested management practices related to its future handling and use.**	
1. Review procedures developed by the company/facility for removing treated wood from service. Are these procedures reflective of current practices? Are applicable staff aware of these procedures?	☐
2. Determine what type of record keeping system the company/facility uses to account for wood taken out of service. Is there some mechanism where treated wood is retired from the financial management system?	☐
3. Is there treated wood taken out of service that is not tracked by the record keeping system? Determine the significance of this untracked treated wood disposal relative to the treated wood that is tracked when taken out of service.	☐
4. Is treated wood being transferred to subsequent users? Verify that record keeping systems accurately track this transfer.	☐

	Check box when item complete
5. Does the company/facility provide information to subsequent users on suggested management practices for the reuse of the treated wood? (Note this would be mainly applicable if the subsequent user is a non-industrial user, e.g., local resident reusing treated wood.	☐
Comments: _____	
H. RECOMMENDATION 8 – When the user is disposing of treated wood, make every reasonable effort to utilize the recommended waste management hierarchy that includes reuse, recycle, and recovery options for treated wood.	
1. Determine how the company/facility is disposing of treated wood. Determine if the company/facility is aware of the approximate percentages of wood reused, recycled, sent for product/energy recovery and land filled. If not, determine what barriers are present that prevent the company/facility from gathering this information.	☐
2. Review company/facility procedures for disposing of treated wood. Does this procedure reflect current practice? Review company/facility procedures for disposing of treated wood. Does this procedure reflect current practice?	☐
3. Determine how the company/facility minimizes the amount of treated wood going to landfill. Review if reasonable efforts have been made to divert material from the landfill. Identify any barriers that prevent treated wood from being diverted from the landfill.	☐
Comments: _____	
I. RECOMMENDATION 9 – Make every reasonable effort to continually improve the handling and management practices of treated wood.	
1. Determine how the company/facility improves the handling and management practices of treated wood. Note this can be through the periodic review of procedures, review of training requirements for staff, review of purchasing, storage and disposal practices, etc.	☐
Comments: _____	

	Check box when item complete
J. **Other Considerations**	
1. Two other considerations that were documented in the User Guidance Document were record keeping and awareness/training for staff. These issues are key to showing that the company/facility has documentation to show that the recommendations are being adhered to and that appropriate staff are aware of requirements.	☐
2. The records should be of sufficient detail so that an outside person could reasonably determine that the company/facility has addressed the requirements of the recommendations. The records should be able to be associated with a particular activity, easily retrieved and maintained in a manner that protects against damage, deterioration or loss.	☐

Comments: _____

_____

_____

_____

_____

Overall Comments: _____

_____

_____

_____

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_____

Auditor **Date**