TREATED WOOD POLES:
IN USE AND IN THE ENVIRONMENT

QUESTIONS AND ANSWERS ABOUT UTILITY POLES
What are treated wood poles and why are they used?

A treated wood pole is a wood structure typically made from a tree trunk (with its bark removed) that is treated with chemical preservatives.

Treated wood poles range in size from less than 7 inches to more than 20 inches in diameter and from less than 30 feet to more than 100 feet tall.

The lower portion, or butt section, of a treated wood pole is placed deep enough in the ground to be stable and to support pole crossarms, electrical lines, and other pole components. The electrical lines stretching from pole to pole distribute and deliver electricity from utility generation facilities to residential, commercial, and industrial areas.

Treated wood poles also are used to support service lines for communication systems and cable TV. In addition, they can be used to support lighting for exterior areas, hang roadway or street signs, mount emergency fire or police call boxes, and position convex safety mirrors at dangerous intersections.

How many treated wood utility poles are in service?

Estimates indicate that there are more than 60 million utility-owned poles in the United States with more than 54 million associated crossarms.

A survey of utilities in Canada conducted in 2000 indicated that there were nearly 11 million wood transmission and distribution poles in service, of which approximately 87% (about 9.5 million) were utility-owned.

About Treated Wood Poles

- Wood poles are treated with preservatives to protect against decay and insect damage
- Treated wood poles provide reliable support for electrical wires and other services
- The service life of treated wood is up to 20 times greater than untreated wood
- Retired wood poles should be handled, used, and disposed of properly
- There are numerous regulations and guidelines concerning wood pole management and use
Why are wood poles treated with chemical preservatives?

Wood poles (including crossarms) are treated with chemical preservatives to protect them from fungal decay and a variety of wood-destroying pests, including insects (such as termites and ants) and microorganisms. This pest protection is very important for two major reasons.

First, if the poles are not treated, pests can compromise the structural integrity of the pole, ultimately resulting in pole failure. When poles break, people can be injured and property can be damaged or destroyed from the impact of a falling pole, not to mention the hazards of the fallen power lines and electrical equipment. In addition, disruptions in electrical service can result.

Second, protecting against decay and pest destruction greatly extends the lives of poles. By increasing the time that they can be used, poles do not need to be replaced as often, thereby helping to stabilize the costs of delivering electricity or providing other services. Additionally, the disruption to residential and business electricity supply and other services is reduced by avoiding bothersome downtimes during pole replacements.

Are there other benefits of using treated wood poles?

Since treated poles last longer and maintain their structural integrity longer than if they were not treated, the demand for newly harvested timber and other resources used in pole production is reduced. Thus, treating poles against wood pests results in the conservation of forested resources throughout Canada and the United States.

In addition, most of the trees grown to produce poles in the United States are fast-growing trees grown in and selectively harvested from managed forest areas in the southern United States, rather than from old growth timber or sensitive environmental areas, such as wetlands or tropical forests.

Why not use other materials for poles?

Other materials can be and sometimes are used to make effective and reliable service poles. In addition, sometimes electrical power lines are placed underground, especially in new developments. However, that option is substantially more costly and physically disruptive. When above ground power lines are used, the selection of pole material typically is based on several factors, including: reliability, performance life, ease of maintenance, cost, aesthetics, and site-specific factors.

There are several types of poles other than wood available, including those made of steel, concrete, reinforced plastic, and aluminum. Many utility companies are testing or using materials other than treated wood for utility poles. However, treated wood poles have several advantages over other types of poles.

For example, the growth, harvesting, and preserving of wood poles typically use much less energy than the production of some alternative types of poles, such as steel poles.
Treated wood poles are lighter than some other types of poles, such as concrete, and, thus, can be transported, installed, and removed more easily. Because wood poles are lighter, the equipment used to install them is lighter and causes less physical disturbance, such as soil compaction and production of ruts.

Furthermore, not all poles can be used effectively in all locations, climates, or soil conditions. As a result, there can be certain weather-based or site-specific performance problems associated with some types of pole materials.

Typically, wood poles are better for worker safety than some other types of poles because they are easier to climb when work needs to be done on the lines. In addition, wood poles can be easier for workers to repair, maintain, or modify.

Finally, when the entire life cycle for poles is considered, treated wood poles often tend to be less costly than other alternatives. And, because wood poles are made from trees — a domestically grown renewable resource — their use does not rely heavily on non-renewable resources or imported material from foreign sources.

What happens to the preservatives after the poles are put in service?

Most preservatives are added to wood poles under pressure to make sure that as much of the preservative as possible stays in the wood fiber to provide continued protection against pests. However, over time some of the chemicals in the preservative can be broken down by nature (degraded) or released from the wood.

Degradation can occur in several ways, including from sunlight or activity of microorganisms. Release can occur as volatilization, in which some of the chemical preservatives are released to the air, or leaching, in which some of the chemical preservatives move from the wood into surrounding soil. For example, during a rainstorm, the water that runs down a treated pole can carry small amounts of the preservatives that have dissolved. In addition, in some cases, a small amount of the chemicals can slowly move downward through the wood to the pole groundline.

Thus, if the air very close to a treated pole is tested, some of the chemicals might be detected as a result of volatilization from the pole. And, if the soil near the pole is tested, some of the preservative chemicals may be detected.

The types and amounts of chemicals that will be released from the pole depend on the nature of the chemicals (ease of dissolving and volatilizing) and the nature of the pole site (typical temperatures, rain amounts and duration, and so on).

Studies at treated wood pole sites typically show that the small amounts of preservatives that migrate to the soil tend to be very close to the pole. For example, in a study of 180 wood pole sites carried out by the Electric Power Research Institute (EPRI), the concentrations of preservatives within a few inches of the poles decreased exponentially (by factors of 10) away from the pole. Similar results were observed in a parallel study by EPRI on other treated wood pole sites.

Are the chemicals used to treat poles toxic?

The chemical formulations for wood pole preservation are effective pesticides, just like the pesticides most people commonly use in their homes and in their yards or gardens.

Similar to other pesticides, wood preservatives are designed to contain materials that inhibit the growth of organisms. As a result, these chemicals are toxic and exposure to them should
be minimized, just as exposure to household pesticides should be minimized.

However, it is very important to distinguish between the chemical preservatives and the chemically preserved wood products. Remember that wood preservation is designed to keep the preservative in the wood to maintain its effectiveness and limited, incidental contact with treated wood poles is not generally regarded as a major health risk.

Why are toxic chemicals used to treat wood poles?

The preservatives for wood poles and other wood products need to effectively inhibit decay and the growth of destructive organisms. While it would be best to use preservatives that are non-toxic, economically reasonable, completely effective, and have no adverse ecological impacts, there are no such materials available. As a result, even though currently used wood preservatives contain some toxic chemicals, they have been used effectively for many years.

Are treated wood poles considered toxic?

Although the preservatives used to treat poles are considered toxic, the U.S. EPA does not consider treated poles to be toxic or to present a significant health risk. Nevertheless, since the poles were treated with powerful pesticides, care should be taken to limit repeated direct exposure to treated poles, just as care should be taken to limit direct exposure to other treated wood products and other materials containing pesticides.

Do treated wood poles cause cancer?

Although some of the components in wood preservatives are classified by the U.S. EPA as known or probable carcinogens, neither laboratory nor epidemiological studies on wood preservatives have indicated that incidental exposure to treated wood poles causes cancer in humans.

About Wood Preservative Treatment

What types of preservatives are used to treat wood poles?

There are various chemical formulations that can be used to preserve wood. In general, three major categories of wood preservatives are used for utility poles: creosote preservatives, oil-borne preservatives, and waterborne preservatives.

Creosote, made from coal tar, contains chemicals known as cresols and polycyclic aromatic hydrocarbons (PAHs).

Oil-borne preservatives include pentachlorophenol (PCP or Penta) and copper naphthenate.

Waterborne preservatives include chromated copper arsenate (CCA), ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), chromated zinc chloride (CZC), acid copper chromate (ACC), and ammoniacal copper quaternary compound (ACQ).

About 330 million cubic feet of wood (including wood poles, lumber, plywood, and other wood products) are treated annually in the United States with these preservatives. However, most of these preservatives are also used for other purposes, such as desiccants, herbicides, disinfectants, and growth regulators.

How much preservative is contained in treated wood poles?

The amount of preservative used to treat each pole will depend on several factors, such as the species of wood, the diameter of the pole, type of preservative or carrier fluid used, and so on. Preservative treatment levels are specified in terms of amount of preservative retained by the wood. In the United States, the preservative retention level is given as pounds of preservative per cubic foot of wood and in Canada it is kilograms per cubic metre.

Currently in the U.S., typical preservative retention levels range from 4.5 to 20 pounds per cubic foot (pcf) for creosote-treated poles, 0.23 to 1.0 pcf for PCP-treated poles, 0.04 to 0.15 pcf for copper naphthenate-treated poles, and 0.6 pcf for poles treated with waterborne preservatives. [Canadian standards (CSA 080 Series) are available on the Canadian Institute of Treated Wood (CITW) website, listed at the end of this document.]
How are wood utility poles treated?

Wood utility poles are initially treated before they are put in service using pressure-treatment techniques. During this process, the poles are dried and then placed in large treatment vessels. Either an initial vacuum or pressure is applied, fluid is added, and the pressure inside is increased. This increased pressure forces the preservative into the wood over a period of time. The time of treatment, process temperature, and amount of pressure vary depending on the type of preservative used and the nature of the wood being treated.

Why is pressure used in the treatment of wood poles?

Pressure is used to make sure that the preservative penetrates into the wood in order to ensure the long-term effectiveness of treatment. By using pressure, much more preservative can be retained by the wood than by simply coating the pole surface with preservative or dipping the pole in preservative.

The depth of penetration of preservatives into wood poles varies with the species of wood, type of preservative, and process conditions.

Are consumer wood products also treated with preservatives?

Yes, many lumber products sold to or used by consumers are treated with preservative to protect them against pests. For example, most lumber used for exterior structural support purposes, such as posts, columns, decking, bridges, fences, guard rails, foundations, and so on, is treated with preservatives. Indoor applications of pressure treated wood include laminated beams for house construction, wood foundations, sill plates, floor trusses, and sub-flooring.

In addition, similar to wood poles, pressure treatment is used in many cases to make sure that lumber preservatives penetrate deeply into the wood, thereby ensuring long-term integrity of the wood product. Some wood products, such as particleboard and plywood, can be produced using non-pressure treatments.

Are there standards for the treatment of wood?

Yes, since 1904 the American Wood-Preservers’ Association (AWPA), an independent academic/industry organization, has established a set of detailed standards for the treatment of wood products, including wood poles, using a wide variety of preservatives.

The standards for wood poles provide specific guidelines and requirements for the preservatives to be used, preparation of the wood pole prior to treatment, conditions of both pressure and non-pressure treatment, extent of penetration into the wood, and expected level of preservative retention.

The AWPA Standards also cover acceptable means of testing preservatives, evaluation standards, and supplemental treatments.

The AWPA’s counterpart in Canada is the Canadian Institute of Treated Wood (CITW). CITW promotes a similar set of standards to those of the AWPA. The Canadian standards were developed by the Canadian Standards Association (CSA) and cover a broad range of treated wood products for industrial and commercial uses.

Are there government regulations or controls concerning wood preservatives, wood treatment, and treated wood?

In both the United States and Canada there are extensive government regulations, guidelines and controls covering the appropriate use of wood preservatives and preserved wood along with specific protections for worker safety and consumer safety throughout the lifetime of the treated material.

For example, under the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA), the U.S. EPA regulates all wood preservatives used in the United States. Before any manufacturer can register a pesticide for use in the U.S., it must generate sufficient data on potential toxicity and environmental impacts to satisfy the requirements of the EPA. If those
requirements are not met for a given chemical formulation, the producer cannot sell or use that pesticide.

Additionally, all EPA-registered pesticides periodically go through a formal re-registration process. This process includes an extensive review of each registered pesticide to determine if it can remain in use.

Most of the chemical formulations used to treat wood utility poles, including creosote, PCP, and waterborne pesticides, are designated as “restricted-use” pesticides by the EPA. Only professionals who are trained and certified in their handling and use should apply these types of pesticides. For example, states typically require Restricted-Use Certified Applicator Licenses in order to purchase and use restricted-use pesticides. In addition, some states may require licenses for general-use pesticides.

In Canada, approval and licensing of all pesticides, including wood preservatives, is governed by the Pest Management Regulatory Agency (PMRA) under Health Canada, through the Pest Control Products Act. Environment Canada, in consort with Health Canada, addresses environmental considerations concerning pesticides.

Similar to the U.S., the use and application of pesticides in Canada is governed by provincial legislation that requires such activities to be restricted to licensed professionals.

Although the pesticides used to produce treated wood poles are regulated under FIFRA (in the U.S.) and under PMRA (in Canada), treated wood poles and other treated wood products are not considered to be pesticides and, as a result, they are not regulated under these statutes.

Finally, there are various Federal, State/Provincial, and local requirements concerning the management and use of treated wood poles. Utility companies comply with these requirements.

What happens to poles after they are treated?

After treatment, poles can be installed for service or stored in pole storage yards for future installation. The AWPA Standards provide the requirements for the care of treated poles after treatment, including: handling, storage, field fabrication or treatment, loading, shipping, and management of the treated poles.

How effective is pole treatment and how long do wood poles typically last in-service?

The use of chemical wood preservatives is very effective, typically extending the useful life of a pole by a factor of 5 to 20 times. Treated wood poles can last for decades in service with some poles having in-service lives of 50 years or more. For example, while the average life of a creosote-treated pole is between 25 and 30 years, some have been in service for more than 75 years. Similarly, PCP-treated poles and poles treated with waterborne preservatives can last 60 years or more.

Factors impacting the effective lives of treated wood poles include the type and amount of pesticide used, climate of the pole site, weather conditions, and soil properties. Often times wood poles are removed from service not because the preservative is no longer effective, but because of damage from natural or man-made actions, such as woodpecker damage, lightning strikes, and auto accidents, or because of changes in the service requirements.

Are in-service poles ever treated while they are in place?

Since the original preservative chemicals can break down over time by natural processes, in-service poles sometimes need to have supplemental treatment to prolong their useful lives. Most often, this additional treatment is needed because of signs of decay in the groundline area (the area of the pole where it touches the soil). By adding additional preservative to the impacted area the pole life is extended and there is less disturbance to the surrounding area because the pole does not have to be removed and replaced.

Typically, supplemental treatment is applied manually to the bottom portion of the pole near the groundline where...
decay is most likely to occur. Since the goal of supplemental treatment is to protect the area subject to decay, the preservatives used for supplemental treatment must stay inside or close to the pole, otherwise their effectiveness is lost and the costs of treatment wasted.

How many treated poles are retired from service each year?

Currently in the United States, of the estimated 60 million utility-owned treated wood poles, about 2 to 4% (approximately 1.2 to 2.4 million poles) are taken out of service each year. In Canada, an estimated 0.6% or approximately 66,000 poles are removed from service annually. At the majority of these pole locations, new replacement poles are installed.

What happens to wood poles after they are taken out of service?

The management of treated wood poles retired from service will depend on the type of wood, condition of the pole, preservative used, and policy of the pole owner. For example, some utilities recycle the used poles for their own purposes, such as cutting the pole and using portions of it for short poles, fencing, lumber, or as structural support for another pole. Some utilities sell or give away used poles for appropriate uses by ranchers, farmers, businesses, or others.

When retired poles are recycled in this manner, information sheets, such as EPA-approved Consumer Safety Information Sheets (CSIS), Material Safety Data Sheets (MSDS), or other prepared material should be provided to ensure that the poles will be used only for appropriate purposes and that they will be handled and ultimately disposed of properly.

Some used treated poles are burned in accordance with Federal and State/Provincial requirements in commercial or industrial boilers to generate steam or electricity and to recover metals. Creosote-treated wood, for example, is particularly good to burn in permitted boilers because it has a higher heat content (BTU value) than untreated wood.

If the retired poles are reused by utilities in a manner consistent with their treatment, they are deemed to have “second life applications” and are not considered waste. However, if a treated wood pole is removed from service or a second life application and has no other useful function, it is considered a waste and is handled and disposed of accordingly.

For example, if poles can not be reused, recycled, or burned for energy, they can be placed in landfills, according to Federal, State/Provincial, and local requirements. However, disposal in landfills is not the best end use of treated wood poles.

My local utility sells or gives poles away. Can I use these old wood poles for fencing, in landscaping, to burn in my fireplace, or for other purposes?

No treated wood poles should be burned in residential boilers, furnaces, open fires, stoves, or fireplaces because the preservative chemicals can be released from the wood during the burning. In fact, no treated wood of any kind should be burned in residences. The American Medical Association recommends that wood products, such as particleboard and plywood, also should not be burned in the home.

Retired treated wood poles can be used as fencing and landscaping for most applications. For example, retired poles can be used for retaining walls, to frame walkways, and for other landscaping purposes. Because these poles still contain preservative chemicals they should not be used in landscaping or fencing applications which put them in direct contact with plants being grown for food or where human contact is other than incidental.

Retired poles treated with PCP or creosote should not be used for construction of playground equipment, picnic tables, or other high human contact furniture or structures.
No treated wood of any kind is recommended for use in countertops where food is prepared, food storage areas, cutting boards, or other food-contacting surfaces.

In addition, retired wood poles should not be used in the construction of beehives where any of the treated wood could come in contact with the honey nor should treated wood be used to construct animal feed storage areas.

Furthermore, shavings from treated wood should not be used for animal bedding, in animal feed, or for mulch.

These examples are common sense guidelines for the reuse of treated wood poles. To answer specific questions about the use, handling, or disposal of a recycled treated wood pole, refer to the listing of information sources at the end of this pamphlet, the preservative-specific CSIS, or information provided by the utility company.

Can I tell what type of preservative treatment was used on a pole just by its physical appearance?

You cannot easily determine the type of treatment used on a pole by only its physical appearance. However, the supplier brands poles with information about the pole and its treatment.

For example, the brand identifies the plant designation where the pole was treated, species of wood, preservative type used for treatment, treatment date, level of preservative retention, pole classification and pole length. However, as a result of deterioration with age, some pole brands are not easy to read, so you may not be able to determine what type of preservative was used.

Some of my fencing (landscaping) may have been made from used utility poles. Do I need to replace these materials?

Replacing fencing and landscaping made from used utility poles is not necessary since these are acceptable reuse options for any kind of treated pole. However, if the fencing is used in animal pens or enclosures where cattle, cows, or other animals will lick or bite the wood, neither creosote nor PCP-containing wood should be used.

Are there any special precautions for handling used treated poles?

The precautions a homeowner should take for handling used poles are those that would typically be taken when working with any building materials. For example, you should wear gloves whenever you handle the treated wood. For creosote- and PCP-treated wood, it is recommended to wear long sleeves, long pants, and chemically impervious gloves (vinyl coated).

If you are cutting or working with the wood, goggles or other eye protection should be worn and a dust mask should be worn to reduce inhalation of any sawdust generated. If possible, prolonged sawing of treated wood should be done outdoors to reduce the exposure to sawdust.

After completing the work, any debris or sawdust should be cleaned from the residential work area and discarded.

As in any household construction project, hands and any other exposed skin should be washed thoroughly after the work is completed and before doing any other activities, including eating or drinking. Clothes with preservative stains or accumulated sawdust should be washed separately from other laundry.

For additional information on how to handle specific types of treated wood, refer to the CSIS for the preservative of interest.
How do I dispose of used treated wood?

To dispose of treated wood properly it is best to check with local regulations concerning proper disposal in your area. Typically, homeowners can put used material from treated wood (such as sawdust, chunks of used wood, or wood remnants) in the trash for placement in a landfill. In areas where there is no curbside trash collection, the material usually can be taken to the local transfer station and placed in designated treated wood disposal areas.

What should I do if my child touches or grabs a treated pole?

Washing with soap and water is recommended whenever children have been playing outdoors because they often are in contact with soil and could touch treated wood products, such as wood playground apparatus, treated picnic tables or other outdoor furniture, landscaping timber, marine pilings, or decking.

Because treated wood poles do contain chemical preservatives, both children and adults should avoid extended and direct skin contact with them.

My child was playing near a wood pole and got a wood splinter from the pole in his hand. What should I do?

In general, a splinter from a wood pole should be handled in the same manner that any wood splinter would be treated. First, carefully remove the splinter, then thoroughly wash the area. Finally, add antibiotic cream and a bandage, if needed.

Should I allow my child to play in the dirt surrounding a treated pole?

As previously discussed, some of the preservative from the pole can migrate to the nearby soil. Because the soil directly adjacent to the pole might contain these preservatives, it is not an appropriate place for children to play on a regular basis. Thus, it is best not to allow children to frequently play in the soil directly surrounding a treated pole.

If children do play in the soil directly adjacent to a pole, they should wash thoroughly after playing, as would normally be done after outdoor activities.

Can I plant flowers around the wood pole on my property?

Flowers can be planted around the wood pole, however, the preservatives in the soil directly in contact with the pole could inhibit growth of vegetation. In addition, since the fill material around the pole is used to keep the pole upright, it may not be particularly good for growing flowers. Also, digging large holes around the pole is not recommended because they could compromise the stability of the pole.

Can I plant vegetables or fruits near the wood poles on my property?

Because some of the preservatives can leach out of the pole over time and enter the soil adjacent to the wood pole, it would not be prudent to plant fruits, vegetables, herbs or other material to be consumed in close proximity to treated poles. However, if there are some treated poles on your property that are located away from the edge of your growing area, there should be no problem.

My property has several treated wood poles between my house and the nearby street. Since my drinking water comes from a well on the property, will it contain wood preservative chemicals?

While it is not impossible for preservative chemicals to migrate to a drinking water aquifer, it is unlikely that significant amounts of pole treatment chemicals from a treated wood pole would find their way into your drinking water. In fact, studies carried out by EPRI in the 1990s indicated that if PCP leached from poles and entered the shallow groundwater adjacent to the pole, the concentrations decreased very rapidly away from the pole. As a result, it is unlikely that significant amounts of preservatives will reach a drinking water aquifer.
Where can I get more information about pole treatment and wood preservatives?

There are numerous sources of information on wood preservatives and treated wood poles. For example, EPA-approved Consumer Safety Information Sheets (CSIS) are available at locations where treated wood products are sold or from the American Wood Preservers Institute (AWPI). The CSIS provide instructions for the use and proper handling of treated wood materials.

Other sources of information include the following organizations and Internet sites:

- **American Wood-Preservers Association (AWPA)**
  P.O. Box 5690
  Granbury, TX  76049
  (817) 326-6300
  www.awpa.com

- **American Wood Preservers Institute**
  2750 Prosperity Avenue, Suite 550
  Fairfax, VA  22031-4312
  (703) 204-0500
  www.preservedwood.com

- **Canadian Institute of Treated Wood (CITW)**
  2141 Thurston Drive
  Ottawa, Ontario  K1G 6C9
  (613) 737-4337
  www.citw.org

- **Consumer Safety Information Sheets**
  Hotline:  1-800-282-0600
  www.ccasafetyinfo.com

- **Electric Power Research Institute (EPRI)**
  3412 Hillview Avenue
  Palo Alto, CA  94304
  Customer Assistance Center:  1-800-313-3774
  www.epri.com

- **Environment Canada**
  351 St. Joseph Boulevard
  Hull, Quebec  K1A 0H3
  (819) 997-2800
  www.ec.gc.ca

- **Southern Pine Council (SPC)**
  P.O. Box 641700
  Kenner, LA  70064-1700
  (504) 443-4464
  www.southernpine.com

- **U.S. Environmental Protection Agency**
  1200 Pennsylvania Avenue
  Washington, DC  20460
  National Response Center (800) 424-8802
  www.epa.gov

- **American Wood Preservers Institute**
  2750 Prosperity Avenue, Suite 550
  Fairfax, VA  22031-4312
  (703) 204-0500
  www.preservedwood.com

- **Environment Canada**
  351 St. Joseph Boulevard
  Hull, Quebec  K1A 0H3
  (819) 997-2800
  www.ec.gc.ca
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