# Pest Management Guide

## for Wood Structure Maintenance by the BC Hydro and Power Authority

**Version: 1.0**
**Document amended from PMP 105-0981-14/19, ver3.0**

**December 16, 2019**

BC Hydro
Power smart

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# Executive Summary

## About BC Hydro

BC Hydro is a provincial Crown corporation and one of the largest electric utilities in Canada. The company's mandate is to generate, purchase, transmit, distribute, and sell electricity.

The distribution system represents power lines with voltages less than 60 kilovolts, while the transmission system is comprised of power lines with voltages between 60 and 500 kilovolts.

A transmission line carries high voltage electricity over long distances from generating plants and delivers it to substations, where voltage is reduced for delivery to customers via distribution lines.

## About the Pest Management Guide

BC Hydro's Pest Management Plan (PMP) is no longer active. The MOE confirmation expired April 1, 2019.

As of April 1st, 2019, BC Hydro's Test and Treat program uses only boron-copper-based wood preservatives, which are listed on Schedule 2 -excluded products. As such, BC Hydro no longer needs to submit a PMP to the MOE for its Test and Treat program based on *the Integrated Pest Management Act*.

BC Hydro will retain this PMP document, retitled Pest Management Guide, as a reference and guidance document as it captures the evolution of the Test and Treat program. Obsolete sections have been redacted to ensure the document reflects current procedures and approved materials. This document will be reviewed annually by the BC Hydro Test and Treat Manager and Vegetation Specialist Department to ensure that the document remains aligned with procedures and standards.

Although the document has been retitled Pest Management Guide to distinguish it from the expired PMP, references to PMP were retained within this document to align with the naming convention contained in the Test and Treat maintenance standards.

As defined in the *Integrated Pest Management Act*:

> A Pest Management Plan (PMP) describes
>
> a) a program for managing pest populations or reducing damage caused by pests, based on integrated pest management; and

b) the methods of handling, preparing, mixing, applying, and otherwise using pesticides within the program.

This PMP confirmed BC Hydro's program to employ wood preservatives under the BC Ministry of Environment *Integrated Pest Management Act* and *Regulation*. In particular, BC Hydro uses wood preservatives to control wood pests and preserve its wood poles, and to a lesser extent, other wood structures on its property. BC Hydro maintains about 900,000 wood poles on the distribution system and 100,000 wood poles on the transmission system.

This PMP was a requirement under Section 58 of the *Integrated Pest Management Regulation*, and in addition it provides for the following:

- public awareness of, and input into, BC Hydro's pest management activities in the context of integrated pest management
- effective, cost-efficient pest control on wood structures
- responsible use of wood preservatives

## Wood Pole Test & Treat Program

BC Hydro carries out a Wood Pole Test & Treat Maintenance Program to ensure a safe and reliable power supply system, while respecting the environment. The Program inspects wood poles and uses wood preservatives, as required, to maintain and prolong the life of poles, and for safety and reliability reasons.

### *Why Treat Wood?*

Wood rot or structural damage from wood-boring insects can cause wood pole failure with resulting risks to public and worker safety, property damage, and increased service outages. Pest species to be controlled under this PMP are ants, termites, wood-boring insects, and wood-decaying fungi.

The financial and environmental cost of *not* treating wood poles is significantly greater than the cost of treating them. The use of wood preservatives reduces the number of trees that need to be harvested and can extend the service life of wood poles up to five times. Depending on climate, location, and type of wood, wood poles in BC last between 35–70 years with treatment, but only 15–25 years without treatment.

### *Responsible Treatment*

BC Hydro is a leader in the field of wood pole treatment and responsible use of wood preservatives. Its research and development program carries out studies and other initiatives to find the most effective, state-of-the-art, and environmentally-friendly treatments and alternatives.

Only applicators certified through the Ministry of Environment (MoE) are permitted to handle and apply wood preservatives. Certified applicators must adhere to all legislation, standards, and safety requirements. In addition, before applicators are authorized by BC Hydro to apply wood preservatives, they must complete a work training program.

### *About Wood Poles and Structures*

Wood is used for poles because it is strong, climbable, widely available, renewable, and economical. Wood poles are also a proven product, produced and manufactured locally. Most distribution structures in British Columbia are made of Western redcedar, Lodgepole pine, or Douglas fir, while wood transmission structures are predominantly made of Western redcedar. Current distribution standards require wood poles to be made from western redcedar.

Alternatives to wood poles include thin-wall and light duty steel poles, fiberglass poles and concrete poles. Concrete is not an acceptable alternative to wood. Concrete poles are not used because they are difficult to hand, have a low strength-to-weight ratio, and are not cost effective. Steel poles are not readily available, are hard to obtain, and are mostly used for heavy duty applications. BC Hydro is considering the use of fiberglass poles, however, like steel and concrete poles, they are not easily climbed and require a bucket truck to access the wires and pole tops. Finally, these

alternatives to wood require special training for staff and are often less cost effective.

Utility wood poles are purchased pre-treated, but subsequent preservative use is required to maintain the poles.

Treatment of wood poles includes the pole itself, as well as the cross-arms and timbers. Conductors (wires) carrying the electricity from pole to pole are supported by insulators, which are attached to wooden cross-arms. When two or more poles comprise a structure, they are usually connected to each other with one or more timbers to increase strength, stability, or both.

## Environment and Safety Issues

BC Hydro recognizes the importance of protecting aquatic, marine, and riparian ecosystems to ensure their long-term sustainability

BC Hydro complies with established no-treatment zones (NTZ), which are areas of land that must not be treated with pesticide.

The use of wood preservatives on wood structures is not known to harm the environment or animals/fish, because preservatives used are of low [redacted] toxicity. Products are either placed inside the pole and the holes plugged, or they are applied externally to the pole below the ground line and covered securely with a bandage. These protective measures ensure that people, animals, and fish will not come into contact with the preservatives.

Research has shown that wood preservatives used in this program stay bound tightly to the wood pole. They also are not released into the atmosphere, and none of the products used are ozone-depleting.

Because BC Hydro uses only certified and authorized applicators, there is little risk of misapplication, over-application, or spillage of wood preservatives. All applicators carry spill kits and other protective equipment with them and are trained in their use.

## Definitions

For BC Hydro wood structures, a **pest** means primarily wood-destroying insects and fungi.

**Wood preservation** means to preserve the usefulness and structural strength of wood by chemical treatment.

**Wood preservatives** mean chemicals that are applied to the surface or interior of wood to protect it against both insect and fungal damage.

**Integrated pest management (IPM)**, as defined in the *Integrated Pest Management Regulation,* means a process for managing pest populations that includes the following elements:

(a) planning and managing ecosystems to prevent organisms from becoming pests;

(b) identifying pest problems and potential pest problems;

(c) monitoring populations of pests and beneficial organisms, damage caused by pests and environmental conditions;

(d) using injury thresholds in making treatment decisions;

(e) suppressing pest populations to acceptable levels using strategies based on considerations of

(i) biological, physical, cultural, mechanical, behavioural and chemical controls in appropriate combinations, and

(ii) environmental and human health protection;

(f) evaluating the effectiveness of pest management treatments.

# Program Description

This section of the PMP fulfills the requirements of Section 58 of the *Integrated Pest Management Regulation*. Each heading covers a particular subsection of Section 58, which is reproduced from the Regulation in the boxed text.

## Geographic Area of the PMP: Section 58(1)(a)

***58 (1) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following identifying information;***

***(a) a description of the geographic boundaries of the area to which the plan applies and maps or diagrams showing proposed treatment areas within that area;***

This PMP covers all areas of the province where BC Hydro-owned wood structures are located. It covers the use of wood preservatives for wood poles and wood structures on roadside circuits, distribution easements, rights-of-ways (ROWs) and on any wood structure associated with the generation, transmission or distribution of electricity. This also includes wood structures at facilities such as substations, storage sheds, pole yards and bridges on BC Hydro access roads. BC Hydro is allowed to manage these areas as per Section 20 of *BC Hydro and Power Authority Act* and as per right-of-way agreements. BC Hydro is also contracted by the City of New Westminster to manage its power line wood structures.

BC Hydro maintains about 900,000 distribution wood poles over 45,000 km of distribution lines and approximately 100,000 transmission wood structures over 18,000km of transmission lines.

About 90% of BC Hydro's distribution lines run along public road allowances (either underground or above-ground). Almost all BC Hydro distribution poles are made of wood, but a few are made of concrete or steel. Many distribution and transmission poles are used jointly by BC Hydro and other utilities such as telephone and cable companies, fibre optic and cellular phone companies. All joint use poles are maintained by BC Hydro.

Transmission lines and their supporting structures run through diverse areas and terrains, from mountainous wilderness areas to cities. Approximately 100,000 wood structures, 22,000 steel structures and a few hundred fibreglass structures provide support in the transmission system. Much of the land through which corridors run is used for a wide variety of public purposes,

including recreational, agricultural, and commercial. Most transmission lines are located on statutory Rights of Ways (RoWs).

## Person Responsible: Section 58(1)(b)(c)

***58 (1) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following identifying information;***

***(b) the person responsible for managing pests in relation to the land described in paragraph (a);***

***(c) the name and phone number of an individual who is the principal contact for information relating to the pest management plan.***

The person responsible for managing wood structure pests on the BC Hydro Distribution system is Z. Maletic, Senior Engineer, Distribution Strategy and Standards. Phone: 604- 528-1413.

The person responsible for managing wood structure pests on the BC Hydro Transmission system is L. Gilpin-Jackson, Specialist Engineer, Transmission Strategy and Standards. Phone: 604-516-8918.

The principal contact to obtain information relating to the Wood Pole Test & Treat Program is: R.Kariz, Vegetation Management Specialist, Phone 250-549-8582.

## Prevention Program: Section 58(2)(a)

***58 (2) A pest management plan prepared for the purpose of section 7 (1) (a) of the Act must include the following integrated pest management elements:***

***(a) a description of the program that will be employed to prevent organisms from becoming pests;***

The Wood Pole Test & Treat Program is primarily a preventive program. Every aspect of wood pole management is geared to prolonging the pole's life, from initial purchase to ongoing inspection and maintenance programs.

BC Hydro prevents pests from becoming established in wood poles in the following ways:

- Western redcedar is now used instead of other less durable wood species such as Lodgepole or Jack pine, which have a higher failure rate especially in wet coastal areas.
- Stringent purchasing requirements have been developed that exceed industry standards for the quality of the poles purchased.
- To prolong the service life of poles, new poles are sterilized to ensure that any wood-decaying fungi or insects present in the trees when harvested are killed.
- BC Hydro purchases only full-length pre-treated poles, which generally suffer little decay during the first 20–30 years of their life. All new poles are chemically (wood preservative) treated in a pressure vacuum system and are subjected to a thermal process to “fix” the preservative in the wood. This process ensures that the preservative stays in the wood reducing the risk of leaching. The pre-treatment uses CCA (copper chromium arsenate), the most commonly-used wood preservative in North America.
- On rare occasions, BC Hydro may install structures made of alternate materials. However, there are some limitations to the use of alternate materials, including high costs, high risk of damage, environmental impacts, safety risks, and special training requirements to use the alternates effectively and dependably.
- Emerging technologies are investigated, such as the use of pole liners. A pole liner is a multi-layered laminate sheaf fitted to the pole’s butt end, which keeps the preservative in place and prevents fungal attack.
- Wood poles may be installed in caissons. A caisson is a long steel (usually galvanized) barrel, and poles are typically set inside two caissons. The caissons may be filled with gravel and rock to hold up the pole in muskeg or permafrost areas, or the pole is cross-braced so it floats in wet areas. Rock and gravel drain rapidly and create a drier environment adjacent to the pole which helps reduce fungal attack.
- During standard maintenance and repair, vegetation may be removed from around the poles and from immediate surrounding areas to ensure access for vehicles and equipment, and prevent forest fires. This will also discourage carpenter ants and other insect pests that use vegetation as cover, and reduce moisture at the pole surface discouraging infestations by fungi.

## Identification of Pest Species: Section 58(2)(b)

***58 (2)(b) A pest management plan prepared for the purpose of section 7 (1) (a) of the Act must include the following integrated pest management elements – either***

***(i) a description of the program that will be employed to identify pests targeted by the plan, or***

***(ii) identification of the pests targeted by the plan;***

There are two basic groups of pests that attack wood poles: insects and fungi, which can attack either above-ground or below-ground. Some pest species can be present in both the above-ground and below-ground portions of the pole. The main pest species to be controlled are:

- **Ants** — Ants frequently seek out high moisture areas in and around wood structures and build their nests in damp wood. In most cases, incipient or advanced decay is already present in wood before ants begin excavating nests. Species of ants that can potentially damage wood include carpenter ants, cornfield ants, and thatching ants.

- **Termites** — Dampwood termites prefer to build their nests in soft, damp wood, which they use for food. Subterranean termites usually live in the soil and only attack poles for food. Both species can also attack dry wood.

- **Other insects** — Wood-boring insects (such as beetles and wasps) can attack wood poles, but most damage is caused by several different species of powderpost beetles. They are attracted to damp wood and standing poles that already have internal decay. Pole failure is rare, but as the population increases, they may reduce much of the interior of the infested wood pole to a powder.

- **Fungi** — Three fungal types, brown and white rot fungi and soft rot fungi, can attack the cells of the wood, reducing the strength of the pole. Most species enter the pole surface from the soil or through above-ground checks or bolt holes. They break down the lignocellulose complex that makes up the cell walls of the wood, causing structural weakening.

# Monitoring Program: Section 58(2)(c)

> ***58 (2) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following integrated pest management elements:***
>
> ***(c) a description of the monitoring program that will be employed before or during the pesticide use for assessing pest populations, environmental conditions and damage caused by pests, which program must include a description of***
>
> ***(i) the monitoring methods,***
>
> ***(ii) the frequency of monitoring, and***
>
> ***(iii) the data that will be collected;***

## *Description of Monitoring Program*

BC Hydro employs preventive maintenance inspections and the application of remedial wood preservative treatments to eradicate pests. This has been standard practice for over 25 years.

## *Frequency of Monitoring*

BC Hydro purchases full length, pre-treated wood poles, however, after several years in service the treatment becomes less effective and remedial treatment commences, which greatly extends the poles service life. The first remedial treatment of wood preservatives is as follows:

- Transmission pole made of Western redcedar – 25 years
- Distribution pole made of Western redcedar – 20 years
- Distribution pole made of other species – 8 years

Pole maintenance inspections and treatments are performed every eight to ten years after the initial 20-25 years (both transmission and distribution poles). This is called the maintenance cycle.

About 90,000 distribution and 15,000 transmission poles are inspected and tested annually.

The eight to ten year cycle constitutes a preventive program. Even though rot may not yet be present at the time of the maintenance cycle, long-term research has shown that the risk of incipient rot is significant at that point. Based on historical information and current research, the treatment of wood poles on an 8 to 10 year cycle has proven to be the most effective, economical, and environmentally-friendly program.

Poles may be treated outside the 8 to 10 year cycle for a variety of reasons, such as changes to the road grade or pole damage. Also, there may be infestations of ants and termites that occurs off-cycle. These are often identified by homeowners or by line crews inspecting equipment.

## *Monitoring Methods and Data Collection*

To decide whether wood poles need to stay in service, be replaced, or be stubbed (reinforced with a short supporting column at the ground line), a detailed inspection is carried out once per maintenance cycle. The poles are inspected by certified inspectors using conventional visual, sounding, and boring techniques and determine the extent of external and internal rot at or near to the ground line.

### Above-Ground Inspection

**Above-ground external inspection** — This procedure is a visual inspection of the above-ground portion of a pole or a pole reinforcement (stub). If obvious damage renders the pole unserviceable or unsafe, the pole must be recommended for replacement.

The inspector will identify, document, and report to BC Hydro the following defects:

**Breaks/cracks** — These features are separations of wood fibres across the axis of a pole (horizontal damage). A cracked pole is reported for assessment.

**Checks —** These are separations along the grain of wood across the annual rings (vertical damage, not cracks). Checks do not reduce pole strength, but serve as avenues for decay spores to enter the pole.

**Woodpecker damage** — Generally, small woodpecker holes, particularly those that follow checks, do not significantly reduce the strength of a pole. A very large woodpecker hole (>7.5 cm diameter) or several smaller woodpecker holes at the same general location on a pole will weaken the pole significantly and may be an indication of insect infestation and/or unsound wood.

**Fire damage** — Fire damage on the lower portion of the pole is normally caused by grass or bush fire and is usually only superficial.

**Pole top rot** — Decay appearing at the outer circumference of the pole top and/or indentations appearing along the apex of the pole top are indications of pole top rot.

**Insect infestation** — Insect infestation can be recognized by one or more signs, such as obvious insect activity, frass (insect excrement), sawdust, or holes on the surface of the wood.

**Above-ground internal inspection** — This procedure is an internal inspection of the above-ground portion of a pole or stub to detect decay inside a pole. The inspector will identify, document, and report defects as follows:

**Sounding** — Sounding will detect internal decay of a pole or stub. A hammer is used to strike the surface of the pole from the ground line to as high as can be reached. A sharp ring indicates sound wood, whereas a hollow sound or dull thud indicates hollow heart or decay.

**Drilling** — Drilling will determine the condition of the inner wood. While drilling, the inspector takes note of the following:

- The rate of penetration of the drill—a sudden collapse of the wood being drilled indicates hollow heart or decay.
- Powdery wood particles indicate insect infestation or dried out decay.
- Wood particles that are darker than normal in colour generally indicate the early stages of internal decay. In the late stages of decay, the wood may become soft and spongy, stringy, or crumbly.

**Probing** — If rot is suspected after drilling, a hooked rod called a shell thickness indicator is inserted. This probing rod further defines the extent and location of decay in checks and pockets.

## Below Ground Inspection

The inspector will identify, document, and report to BC Hydro any defects found during the inspection procedure.

**Excavation of Pole** — Below-ground inspection involves partial or full excavation of the ground around the pole to expose the pole surface. If unsafe, poles are not excavated—i.e., if the pole is rotted through at ground line or if it is not buried deep enough in the ground.

Where poles are set completely in concrete, they are inspected using the above-ground inspection procedures only. If poles are set partially in concrete, the below-ground portions of the poles not covered by concrete are inspected.

**External below-ground inspection** — The pole is excavated, and the old bandage is removed if present. If there is shell rot on the external part of the pole, the rot is shaved off using a scraper, wire brush, hatchet, or spud (small shovel).

**Internal below-ground inspection** — Pole sounding is done below the ground line, then drilling is done to confirm if internal decay is present. Areas of rot and checks are also probed to determine the extent of the decay.

### Stubbed Pole Inspection

On poles with wood stubs there are two sets of fasteners (bands)—one located near the top of the stub and a second located near the ground line. Occasionally, after installation, the lower set of bands is buried due to road grade changes. When buried, decay around the bands is prone to develop. Where possible, the earth covering the buried bands is removed.

## Injury Thresholds: Section 58(2)(d)

> ***58 (2) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following integrated pest management elements:***
>
> ***(d) a description of the injury thresholds that will be applied in deciding whether a pesticide treatment is necessary and an explanation of***
>
> ***(i) how the thresholds were chosen, and***
>
> ***(ii) how the thresholds will be applied;***

As defined in the *Integrated Pest Management Regulation*:

> **Injury threshold** means the point at which the abundance of pests and the damage they are causing or are likely to cause indicates that pest control is necessary or desirable.

### *Eight to Ten-year Cycle Threshold*

BC Hydro has determined that for the average wood pole in service, wood preservatives currently applied in the Wood Pole Test & Treat Program will protect the pole from insects or fungi for eight to ten years. Therefore, the injury threshold is eight to ten years, at which time poles are tested for serviceability and either treated on the spot or recommended for replacement (see the Decision-Making Model on page 28).

The length of the treatment cycle was determined based on manufacturer's recommendations, research reports, historic statistics of pole failure, wood pole type and size, climate and environment, and the practical requirements of the Wood Pole Test & Treat Program. Long-term research has shown that eight to ten years is the most optimal cycle—it is accurate, effective, cost-effective, and environmentally-friendly.

Operational records have shown that the current treatment cycle length is effective since BC Hydro is currently in a steady state. That is, the predicted failure rate closely matches the actual failure rate. Annually, about 1–3% of inspected poles are identified for replacement due to insufficient shell thickness or extensive shell rot. Another 3% of inspected poles are recommended for ground line reinforcement (stubbing) due to the presence of moderate decay at or below the ground line. Various pole top refurbishment techniques are also used to restore deteriorated poles.

## *Serviceability Thresholds*

Before making recommendations on whether to treat, stub (reinforce), or replace wood poles (at the end of the treatment-year cycle), the serviceability of the pole must be properly evaluated. The strength of a pole is related to its physical properties. The decision to carry out treatment on the spot, or recommend stubbing or replacement, depends on the circumference and strength of the pole, the pole loading (equipment on the pole), and the presence of any rot or damage.

### Pole Treatment Threshold

During the wood pole inspection process, treatment will occur as follows:

- When insect pests are present in the wood, or the pole is physically damaged, the pole requires immediate treatment. This can occur at any time over the treatment-cycle.
- External treatment is required when shell rot is detected during the treatment cycle inspection. A wood preservative bandage will be applied. If a bandage is already present, it will be replaced.
- Internal treatment is always required, at the eight to ten-year treatment cycle.  unless it is inside a no-treatment zone or other sensitive area.

### Stubbing Threshold

Wood poles are recommended for reinforcement by stubbing when the upper portion of the pole is in good condition however the following factors have fallen below BC Hydro's serviceability criteria:

- effective shell thickness
- effective circumference at the ground line
- general condition of the pole above or below ground line

Since stubbing is used only as an intermediate measure to prolong the lifespan of an existing wood pole, pole replacement is preferred as it provides a long term solution for a similar cost.

### Pole Replacement Threshold

Poles are generally replaced when it is determined that they do not meet serviceability criteria during pole maintenance inspections.

Poles are recommended for replacement when:

- the strength of the pole is below serviceability criteria
- extensive physical damage above ground is evident
- the effective shell thickness is below serviceability criteria
- on a stubbed pole, internal decay is evident at the band or bolt locations

- the pole is unsafe to climb
- the pole is a hazard to public safety
- the pole is relocated

## Evaluating Effectiveness: Section 58(2)(f)

***58 (2)(f) a description of the monitoring program that will be employed for evaluating the effectiveness of the pesticide use on pest populations and the environment, including effects on organisms other than targeted pests, by comparison with the information collected under the program described in paragraph (c), which program must include a description of***

***(i) the monitoring methods,***

***(ii) the frequency of monitoring, and***

***(iii) the data that will be collected.***

BC Hydro carries out a comprehensive evaluation program to ensure that the treatment has been effective, all requirements of the PMP have been met and there is no environmental damage. In addition, information gained will be used by BC Hydro to continually improve the program. The evaluation program includes:

- contract inspections
- annual inspections
- annual program review
- research

### *Contract Inspections*

Contract work is inspected to ensure it is completed according to specifications and the PMP.

There are two forms of inspection. First, a review is completed of the quality of the applicators' work on a sample of the total number of poles treated. Second, a safety, social, and environmental inspection is completed, and any issues noted are brought to the attention of the contractor (such as proper handling techniques, environmental concerns, etc).

### *Annual Inspections*

BC Hydro carries out annual public safety inspections on the entire distribution system. Every pole in the province is visually inspected to identify any obvious defects and record those that may need remedial treatment.

BC Hydro conducts annual overview inspections of all aspects of the transmission system by inspecting every transmission circuit annually (by

helicopter or drive-by), and more frequently on critical circuits. Obvious defects with the wood structures are identified and recorded in these inspections. A more detailed inspection is mandated later if necessary.

These inspections are carried out in addition to those conducted on an 8 to 10 year cycle under the wood pole test and treat program.

### *Annual Program Review*

The results of the Wood Pole Test & Treat Program are reviewed on an annual basis using the data recorded in a comprehensive database that tracks annual pole replacements and plans budgets based on the failure rate.

This annual review ensures that poles are being treated at appropriate intervals. BC Hydro is currently in a steady state—that is, the predicted failure rate closely matches the actual failure rate. This indicates the treatment cycle is accurate and optimal within current program parameters.

### *Research*

BC Hydro's works with its research division, Powertech Labs. The lab performs life cycle analyses, as well as evaluates products, equipment, and techniques, and their effects on wood poles and the environment. This continual research ensures that the products and procedures BC Hydro uses are always the most effective, well-timed, environmentally-friendly, and cost-effective.

In addition, research from leading university programs specializing in wood preservation and wood structure pests is reviewed to ensure that the Wood Pole Test & Treat Program is considering and incorporating new technologies.

# Treatment Methods: Section 58(2)(e)

***58 (2) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following integrated pest management elements:***

***(e) pest treatment options including***

***(i) a description of the pesticide and non-pesticide treatment methods of controlling pests that may be used,***

***(ii) the rationale for selecting the treatment methods described under subparagraph (i),***

***(iii) the benefits and limitations of each treatment method described under subparagraph (i), and***

***(iv) a description of how a decision to use treatment methods will be made;***

## *Treatment Options*

Three wood pole treatments are used by BC Hydro:

- preservative treatments (internal and external)
- replacing wood poles
- stubbing wood poles

See the *Decision-Making Model* on page 25 for a description of how a decision to use treatment methods will be made.

## *Preservative Treatment*

### Description

Once wood poles have reached their treatment cycle age (see page 9) they are scheduled for testing and treatment on an eight to ten year cycle, unless there is an environmental restriction.

### Benefits and Limitations of Preservative Treatment

There are many benefits to treating poles rather than replacing them:

- With pole replacement, holes must be dug, which means greater soil and environmental disturbance, more use of resources, service interruptions, and greater safety risks to workers and the public caused by pole change-out. Therefore, treatment with preservatives means fewer safety hazards to the public and workers.

- It is significantly more expensive to replace poles than to maintain them through a test and treat program (see the following Table 1).
- Pole inspection and remedial treatment greatly increases the in-service life of the wood pole. This means energy can be conserved and environmental impacts substantially reduced. The heavy equipment used to harvest, produce, preserve, transport, and install new poles consumes fossil fuel and energy. Pole maintenance operations use small vehicles and hand tools. The net effect is less need of fossil fuel and energy to maintain rather than replace in-service poles.
- When fewer poles are replaced, more trees are conserved. This also increases carbon credits.
- Prolonging pole service life reduces the need for disposal of treated poles and associated hardware thereby reducing waste.
- To help ensure the environment is protected, some poles cannot be treated due to Pesticide Free and No Treatment zones and will have a shorter service life.
- Poles located on Federal lands (such as National Parks, Department of National Defense and First Nation Reserves) require special permission as they are not covered by provincial legislation.

### Table 1: Cost of Treatment vs Non-Treatment

As an example, analysis of the wood pole maintenance program and budgets over many years has shown that it costs much more to replace poles than treat them.

| | No Treatment | With Treatment |
|---|---|---|
| Total number of wood poles (approx.) | 1,000,000 | 1,000,000 |
| Average service life | 30 years | 60 - 70 years |
| Annual replacements | 13,000 | 6,500 |
| Replacement and disposal: cost per pole | $ 12,900 | $ 12,900 |
| Annual cost of ownership | $ 61,300,000 | $ 30,650,000 |
| Inspection and remedial treatment cost per year* | $2,833,000 | $ 3,400,000 |
| Total annual cost | $ 64,133,000 | $ 34,050,000 |
| Annual net savings | - | $ 30,083,000 |
| Trees saved from harvest annually | - | 6,500 |
| Net treatment cost – remedial treatment | - | $ 567,000 |
| Net benefit | - | $ 30,083,000 |
| Benefit/Cost ratio | - | 53 |

*Note: Total program cost is $3.4M for inspections and remedial treatment. Material costs for the remedial treatment portion is $567,000.

## *Pole Replacement*

### Description

Pole replacement means the removal of an old pole due to damage or rot, and replacement with a new, pretreated wood pole. A decision to replace the pole is made when treatment will no longer be adequate to maintain the pole safely, or when conditions are met as listed on page 15.

Pole installation is governed by provincial regulations and standards and BC Hydro standards and guidelines. Poles are installed away from sensitive areas, within required constraints. Efforts are made to minimize site disturbance during installation.

If poles are structurally sound they may be reused. If not, sound portions of them may be removed and reused. Poles that cannot be reused are recycled at a value-added, federally and provincially licensed, wood pole recycling facility. The old wood poles are chipped and used for either heating products (untreated) or as an absorbent material in the oil industry (treated).

### Benefits and Limitations

Poles are treated as long as possible before replacement for many reasons (see *Treatment Rationales* on page 17).

An ancillary benefit of replacing a pole is that it may allow a new pole to be placed in a better location, for example, a spot with easier access, fewer environmental issues, or lower traffic for enhanced public safety.

## *Stubbing Wood Poles*

### Description

BC Hydro prolongs the service life of some poles by "stubbing" them. Stubbing is the reinforcement of the ground line area of a wood pole that has decayed below ground. A relatively short reinforcing column, or stub, is fastened next to the pole as a support.

Since stubbing is used only as an intermediate measure to prolong the lifespan of an existing wood pole, pole replacement is preferred as it provides a long term solution for a similar cost.

The current standard is to use steel stubs. In rare cases, wood stubs may be used.

### Benefits and Limitations of Stubbing

- Stubbing allows a delay in replacing the pole for 15–25 years, thereby saving money and trees.
- Stubbing is less expensive than pole replacement, but does not provide as many years of pole life.
- There is less soil and environmental disturbance than pole replacement; therefore, potential effects on people, animals, and fish are reduced.
- Stubbing poses no hazards to the public, but can pose a hazard to workers. For example, equipment may fall off the pole, digging may contact underground gas lines, or accidents can happen with the use of power tools.

## Wood Preservatives: Section 58(3)(c)

***58 (3) A pest management plan prepared for the purpose of section 7(1)(a) of the Act must include the following operational information:***

***(c) identification of each pesticide that will be used under the plan, the manner of its application and the type of equipment required for each manner of application.***

As per Section 79(1) of the *Integrated Pest Management Act*:

**External formulation** — a liquid preservative that is applied to the exterior of wood.

**Ground line bandage treatment formulation** — a preservative in a paste form that is applied to the exterior of wood and then wrapped with a covering.

**Liquid internal preservative** — a liquid preservative that is applied to wood by low pressure through a hole drilled into the core of the wood.

**Solid internal preservative** (not in 79(1)) — a preservative that is inserted into the wood in a solid form.

*Table 2: Wood Preservatives Used for Wood Pole Treatment*

The wood preservatives approved for use by BC Hydro under this PMP are listed in Table 2.

As per *Schedule 2 – Excluded Pesticides, of the Integrated Pest Management Regulation*, boron compounds with up to 5% copper for insect control and wood preservation (commercial) are excluded from the requirements of the IPM Regulation.

| Manner of Application | Active Ingredient | Equipment |
|---|---|---|
| External treatment: liquid and paste [redacted] | [redacted] | [redacted] |
| | [redacted] | |
| | [redacted] | |
| | [redacted] | |
| | [redacted] | [redacted] |
| | [redacted] | [redacted] |

| Manner of Application | Active Ingredient | Equipment |
|---|---|---|
| | copper hydroxide, disodium octaborate tetrahydrate and boric acid | Bandage, stapler, shovel, scraper |
| Internal treatment: liquid and solid | [redacted] | Drill, hand pump sprayer, plug, puffer compressor unit, hammer |
| | disodium octaborate tetrahydrate | |
| | copper hydroxide, disodium octaborate tetrahydrate and boric acid | |
| Internal and external treatment | [redacted] | [redacted] |
| | [redacted] | |
| | [redacted] | |

[redacted]

[redacted]

[redacted]

[redacted]

### Boron / Borax / Boric Acid

Boric acid and borax are forms of boron, which occurs naturally in the environment. It is an essential element in plant growth and is found in the foods we eat. It is also used in detergents, soap, fiberglass, ceramic glazes, topical antiseptic, fire retardants and many other products

### Copper Hydroxide

Copper hydroxide is a form of metallic copper, with the chemical formula Cu(OH)2. It is a pale greenish blue or bluish green solid. Copper is naturally

occurring in the environment. Copper hydroxide is also used to make rayon, paper colorant, dye and pigment, feed additive, and catalyst.

[redacted]

*External Treatments (Bandages)*

## Treatment Rationale

Poles are only bandaged with wood preservatives if external shell rot is present. The treatment is designed to act as an external barrier to prevent fungi from penetrating the wood, or to prevent the exterior pole surface from decaying further.

## Description

[redacted] The bandage is applied around poles, from the ground line to 55–60 cm below the ground line, and stapled carefully to the pole.

The wood preservative is in direct contact with the wood after application and slowly migrates to the outer surface of the pole, where it binds tightly to the wood. [redacted]

[redacted]

**Borax** in bandages dissolves with moisture, forming boric acid, which is water soluble. The boric acid diffuses through the pole to the areas with the highest moisture contents, i.e., the area most likely to be attacked by fungi or insects. Boric acid is toxic to fungi and disrupts the digestive system of insects such as carpenter ants.

## Bandage Types

Two types of bandages are currently used by BC Hydro —pre-made bandages and field-made bandages.

**Field-Made Bandages** — For field-made bandages, the bandage material is wax-coated kraft paper. A thin layer of an oil-based wood preservative paste (grease) is applied to a measured portion of kraft paper with a trowel to meet the manufacturer's recommended thickness. (Some contractors use a bandage maker device.)

**Pre-made Bandages** — Pre-made bandages incorporate a gel-type preservative containing copper naphthenate in a quilted absorbent material, sandwiched between plastic. Until the bandage is cut and placed on the pole, the preservative is essentially encapsulated.

### Benefits and Limitations of External Treatments

- Bandages are effective at arresting below-ground decay on the surface of the pole and/or preventing entry of fungi and insects into the pole.
- Some pre-made bandages leave plastic that doesn't biodegrade, however new products are now available which use biodegradable plastic and are considered preferable.
- Field-made bandages are less expensive than pre-made bandages.
- There is a risk that personnel will get product on them when making bandages onsite, or drop the grease on the ground.

## *Internal Liquid Treatments*

### Treatment Rationale

All inspected poles receive internal treatment whether there are signs of internal decay or not, because drill holes made during inspections act as potential early entry points for decay. It is important to treat poles to prevent this decay.

### Description

Applicators drill a number of holes in the pole above and below the ground line. Using a low volume pressurized sprayer wand attached to a canister, the holes are filled with wood preservative. The holes are sealed with plastic plugs.

**Disodium octaborate tetrahydrate** — Insecticide solutions containing *disodium octaborate tetrahydrate* are inserted internally to control wood-

destroying insects and decay fungi. The preservative may be applied as a liquid, foam, or gel. It is inserted into drilled holes in wood poles in or near the insect colony or fungi. The product penetrates into the wood to various depths, depending on the moisture in the wood and the wood species. When the moisture content of the wood ranges from 25 to 30%, corresponding to the optimal environment for pests, the preservative dissolves into boric acid and diffuses through the pole.

### Benefits and Limitations of Internal Liquid Treatments

- The fumigant moves vertically above and below the application point (with a small amount of lateral movement), which makes the treatment very effective against internal decay.
- The treatment is contained within the poles, so there is no effect on people or the environment.
- Active ingredients are triggered by moisture content that matches conditions that are favourable to the pests.
- The treatment lasts a long time because the preservatives are trapped inside the wood pole and cannot escape.
- Internal liquid preservatives cost less per pole than solid preservatives.
- Special handling and application techniques are required.
- If spilled, the preservatives could have adverse effects on aquatic life.
- Drill bits are used repeatedly without being sterilized, and could possibly carry pest organisms from pole to pole.

## *Internal Solid Treatments*

### Treatment Rationale

Internal solid treatments help prevent fungal growth and insect damage. The active ingredients react with moisture to form boric acid. The rods stay intact until moisture in the pole reaches optimal conditions for pests, then the preservative diffuses through the pole to the areas with the highest moisture content.

### Description

Internal solid treatments consist of inserting a preservative in the form of solid rods or powder into the wood pole.

**Boron rods** - Boron rods contain mostly *disodium octaborate tetrahydrate,* which fuses under heat and pressure to form solid "glass" rods. Applicators drill holes in the pole above and below the ground line, insert the rods into

the holes, and seal the holes with plastic plugs. As long as the moisture content is too low to permit fungal attack, the solid rods remain undisturbed in the wood. When the moisture content of the wood reaches about 20–30%, the rods slowly dissolve and form boric acid. For more information on how boric acid kills pests, see page 22 under *Internal Liquid Treatments*.

**Boric acid** — This low-toxicity mineral is applied in the form of powdered borax or boron-containing salts, which dissolve into boric acid upon contact with moisture in the wood. It is inserted using a puffer device. Powdered boric acid is effective against fungi and insects such as carpenter ants, disrupting their digestive system.

### Benefits and Limitations of Internal Solid Treatments

- Boric acid is virtually benign to aquatic life; therefore, the rods are used to prevent internal decay in poles located near riparian areas.
- Boron rods cost more per pole than liquid wood fumigant.
- Boron rods have a longer period of efficacy once inserted into the pole.
- Rods pose a very low health risk to personnel.
- Boron is used for poles where there are environmental concerns.
- Boron rods are an extremely low-risk pesticide and have been classified as exempted pesticides in the BC provincial IPM Regulation.
- Boron application is easier than fumigant.
- There is no opportunity for spills.
- Drill bits are used repeatedly without being sterilized, and could possibly carry pest organisms from pole to pole.

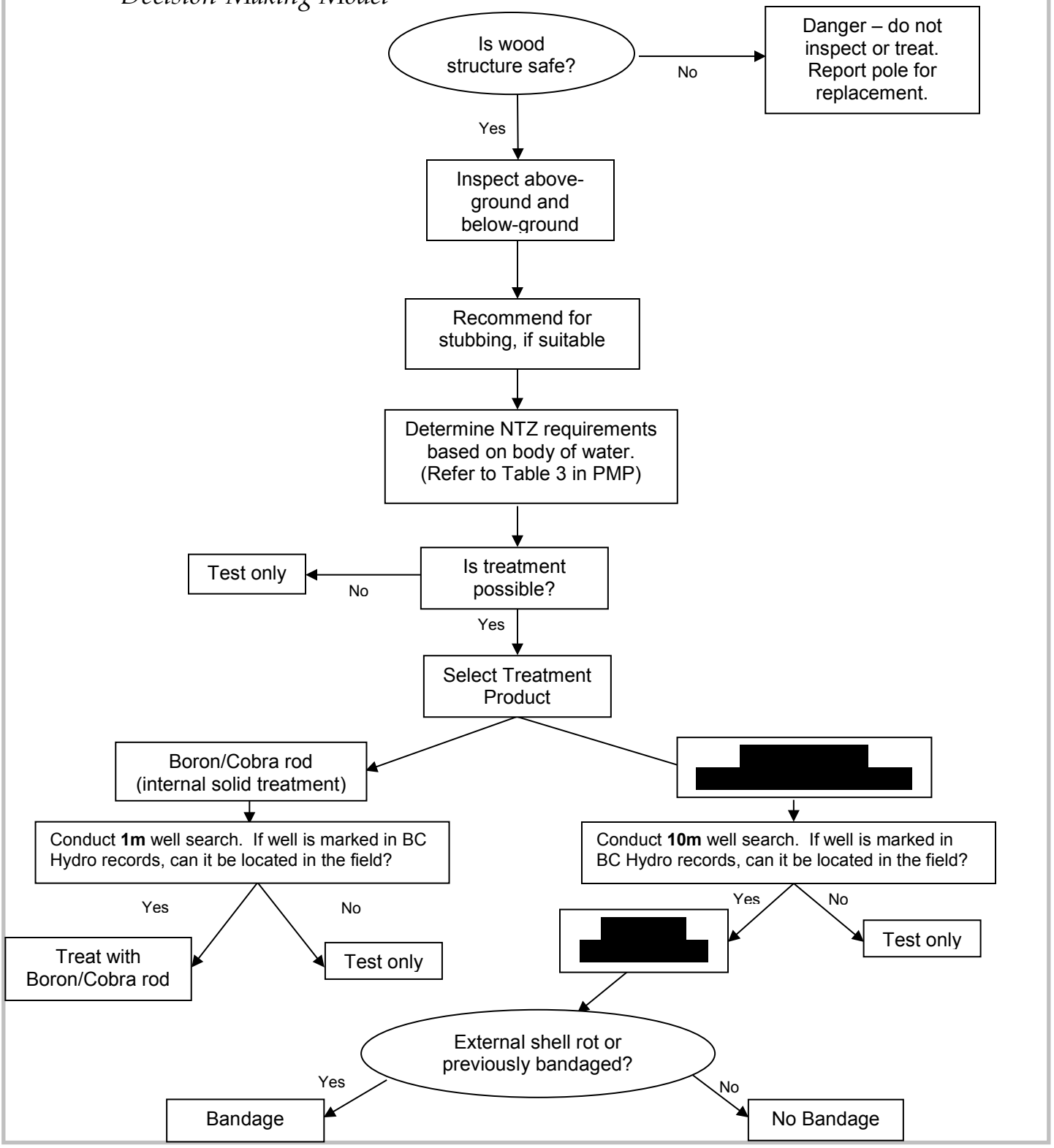
*All Treatments*

**Backfill and Clean-up**

After inspection or treatment, the applicator backfills and firmly tamps the excavated hole around the pole, taking care not to backfill loose articles, turf, garbage, or broken asphalt. Bandages are protected from damage with a shovel during the backfill. Soil is back-filled against the pole to help hold the bandage in place.

Finally, the applicator cleans up the site and removes any broken pavement and debris.

*Decision-Making Model*



## Handling of Wood Preservatives: Section 58(3)(a)

***58 (3) A pest management plan prepared for the purpose of section 7 (1) (a) of the Act must include the following operational information:***

***(a) a description of the methods of handling, preparing, mixing, applying and otherwise using pesticides that will be employed under the plan including a description of the following procedures:***

***(i) procedures for safely transporting pesticides;***

***(ii) procedures for safely storing pesticides;***

***(iii) procedures for safely mixing, loading and applying pesticides;***

***(iv) procedures for the safe disposal of empty pesticide containers and unused pesticides;***

***(v) procedures for responding to pesticide spills;***

### *Responsibilities of Personnel*

All contractors must hold a *Pesticide User Service License* issued by the Ministry of Environment. This license must be in the name of the contractor. The use of a license issued to an alternate firm will not be permitted by BC Hydro.

Applications must be performed or supervised by a certified applicator as per the *Integrated Pest Management Regulation* (Section 72). The certified applicator must:

- Be in continuous attendance at the site while wood preservatives are being applied.
- Have proof of certification at or near the treatment location, readily available for inspection.
- Maintain continuous contact, auditory and/or visual, with the uncertified individuals.
- Be within 500m of persons being supervised.
- Comply with requirements set out in Division 7 of the Regulation, *Records and Reporting Requirements.*

### *General Requirements*

Personnel must adhere to the following legal requirements when preparing to apply wood preservatives, as per the *Integrated Pest Management Regulation*:

- [redacted].
- Know (be informed of) the boundaries of the proposed treatment area, the requirements for personal protection (including Material Safety Data Sheets), and the procedures required to protect human health and the environment.
- Carry out a site inspection at each pole to ensure that the applicable regulatory requirements and standards can be met in carrying out the use.
- Keep wood preservatives in their original containers and with original packaging and labelling affixed, or in appropriate containers with trade name, name of active ingredient, concentration of active ingredient, and pesticide registration number affixed.
- Ensure that domestic and agricultural water sources and soil used for agricultural crop production are protected. In addition, BC Hydro requires that personnel perform a field check to look for drinking water sources, and note any unregistered water intakes or wells.
- Ensure that application equipment is in good working order, and is properly cared for and stored. (Note: no calibration of equipment is required to apply wood preservatives.)

In addition, BC Hydro requires personnel to:

- Hold a pre-job meeting or conference call to discuss the following:
  - intended work schedule
  - work plan for the site
  - types of wood preservatives being used
  - specific issues relating to the site, such as First Nations or public concerns
  - environment and safety issues
- Have current *Material Safety Data Sheets* and product labels for the products they are using, read and follow product labels, and keep a copy of this PMP available at all times.
- Complete Daily Operations Records, and closely follow all specifications.

## *Storage*

Wood preservatives must be stored in a manner that minimizes hazards to human health and the environment. Facilities must be kept clean at all times to help achieve a safe working environment.

Personnel will store wood preservatives in a storage facility according to the requirements of the BC Integrated Pest Management Regulation.

- Store wood preservatives separately from food intended for human or animal consumption.
- The storage facility must be ventilated so that pesticide vapours are vented to the outside.
- The storage facility must not be used for the storage of food intended for human or animal consumption.
- Keep wood preservatives in storage facilities that are locked when unattended and accessible only to authorized persons.
- Each door providing access to a pesticide storage facility will have a sign that is clearly visible to a person approaching the door that has the words WARNING: CHEMICAL STORAGE – AUTHORIZED PERSONS ONLY", in block letters.
- Keep storage facilities separate from work and living areas, flammable materials, and bodies of water.
- Store fumigants and other wood preservatives that release vapours or that display a poison symbol on the label in a storage facility that is not attached to or within a building used for living accommodations.

## *Handling, Mixing, and Loading*

[redacted]

Personnel must handle, load, apply, or dispose of preservatives and containers in a manner that minimizes hazards to human health and the environment.

Personnel must adhere to the following legal requirements for the handling of wood preservatives, as per the *Integrated Pest Management Regulation.*

- Do not wash or submerge in a body of water any container used to prepare, mix, or apply preservatives.

In addition, BC Hydro requires personnel to:

- Ensure that adequate water for washing, first aid equipment, spill kits, and emergency phone numbers are close at hand.
- Decant liquid preservatives and make bandages at least 15 metres from any body of water, and in a location that will minimize the potential for spills entering a body of water (e.g., on flat terrain with a non-porous substrate).
- Keep containers well below eye level to prevent splashing or spilling preservatives in the face or eyes.

### *Transportation*

Personnel must adhere to the following legal requirements for the transportation of wood preservatives, as per the *Integrated Pest Management Regulation*:

- Ensure that the wood preservative is properly secured during transport to prevent accidental discharge or unauthorized removal, and to prevent contamination of food or drink intended for animal or human consumption, household furnishings, toiletries, clothing, bedding, or similar items transported with the wood preservative.

In addition, BC Hydro requires personnel to:

- Follow all applicable transport requirements set out in the Transport of Dangerous Goods Act
- Be familiar with the product label and *Material Safety Data Sheet* outlining the transportation requirements for each regulated product used by BC Hydro.
- Keep in the vehicle a first aid kit, fire extinguisher, spill response contingency plan, and spill contingency kit (with WorkSafe BC-regulated contents). Vehicle operators must be trained to handle spills.
- Inspect containers for defects prior to transport. Transfer any defective packages to empty pesticide containers of the same type, or secure any defective containers into secondary containment vessels for transportation.

### *Application*

In general, personnel who will be applying wood preservatives will follow these BC Hydro requirements.

- Do not apply preservatives to the below ground portion of the pole, if water fills the excavation.

- Do not apply any wood preservatives within a no-treatment zone.

[redacted]

- Refer promptly to BC Hydro any complaints regarding the wood preservative applications.

### *Disposal*

All containers must be appropriately bagged in the field and returned to BC Hydro. The *Hazardous Waste Regulation* (Section 42), requires BC Hydro to:

- Rinse the containers according to the following table.
- Dispose of containers at an approved sanitary landfill or send them back to the manufacturer for appropriate disposal.

| Type of Container | Rinsing Method |
|---|---|
| Rigid plastic or metal (non-pressurized) | Pressure rinse, or single rinse 3 times |
| Glass bottle | Rinse 3 times |
| Paper bag | Rinse |
| Plastic bag | Rinse |

For bandages, BC Hydro requires personnel to:

- Affix contaminated packaging from preservative products to the pole below the ground line.
- Staple the old bandage to the pole below the ground line.

### *Spill Response*

Personnel must adhere to the following BC Hydro requirements:

- Ensure that an appropriate spill containment kit and a spill contingency plan are at the application site.
- Ensure the safety of workers and public by limiting access to the spill area, protecting people from exposure, and ensuring wash facilities are nearby.
- Put on protective equipment before cleaning up the spill, including protective clothing, respirators, and eye protection as required.

- Contain the spill.
- Report all spills to BC Hydro immediately.
- Clean up the site.

## Environmental Protection: Section 58(3)(b)

***58 (3) A pest management plan prepared for the purpose of section 7 (1)(a) of the Act must include the following operational information:***

***(b) a description of the environmental protection strategies and procedures that will be followed under the plan, including a description of the following strategies and procedures:***

***(i) strategies to protect community watersheds and other domestic and agricultural water sources from adverse effects of pesticide use;***

***(ii) strategies to protect fish and wildlife, riparian areas and wildlife habitat from adverse effects of pesticide use;***

***(iii) strategies to prevent pesticide contamination of food intended for human consumption;***

***(iv) pre-treatment inspection procedures for identifying treatment area boundaries;***

***(v) procedures for maintaining and calibrating pesticide application equipment;***

***(vi) procedures for monitoring weather conditions and strategies for modifying pesticide application methods for different weather conditions;***

BC Hydro has carefully considered the requirements to monitor weather, calibrate equipment, and identify treatment boundaries:

- Weather does not affect the accuracy and efficacy of the application because treatments are done below ground or restricted to within the wood pole itself. Most products are purchased ready-to-use, and wind or rain will not affect their application or use. Therefore, BC Hydro does not monitor or record the weather for the Wood Pole Test & Treat Program.
- There is no application equipment to calibrate or keep records of. Rods come pre-made and are inserted into drilled holes. Bandages are pre-made, and those made on site are covered with a standard amount of preservative. For internal treatments, liquid is poured in until the hole is filled, leaving just enough space for the plug.

- Also, since the treatment area is the pole itself, not a land area, there is no pre-treatment inspection for identifying treatment area boundaries. However, BC Hydro does inspect the surrounding area for wells and bodies of water. NTZs are maintained around bodies of water and wells.

*Environmental Protection Strategies*

To ensure that treatments are done in an environmentally sound manner, personnel will:

- Complete pre-job meetings with all certified applicators.
- Ensure that no-treatment zones (NTZ) are adhered to.

BC Hydro may also hold an annual workshop to ensure that all test-and-treat contractors are informed of environmental issues and strategies.

Poles are treated by certified applicators to minimize the risk of misapplication, over-application, or spillage. All applicators carry spill kits.

Techniques have been developed to ensure that the product is placed carefully inside the pole (with holes sealed after insertion) or sealed securely against the pole below the ground line. Because of this placement, people, animals, and fish will not come into contact with the wood preservatives, and the risk of wood preservatives leaching into the soil or air is virtually eliminated. Wood preservatives also bind to the wood, further reducing the risk of leaching.

### Treatment in Sensitive Areas

**Sensitive areas** may include areas with large numbers of domestic animals (such as corrals), and areas adjacent to or within parks, or schools and daycare grounds.

To reduce exposure from wood preservatives within these sensitive areas, workers may install a pole bandage seal in the form of a thin piece of enamel-coated aluminum sheet to cover the top portion of the preservative bandage. The seal is secured to the pole with aluminum or galvanized nails.

### Aesthetics

Every effort will be made to ensure lawns, flowerbeds, and landscaped areas are left in as good a condition as found. Once pole treatment is finished, little or no sign will be left indicating that workers were there. To accomplish this, excavated soil may be placed on tarps or sacks to speed up backfilling and keep lawns soil-free. Sod is peeled back on lawns prior to excavation and replaced when work is completed. Where poles are set in concrete or blacktop, special tools are used as required.

*Bodies of Water and Wildlife*

## No-Treatment Zones

BC Hydro ensures that wood preservatives will not be applied within established no-treatment zones (NTZ), as per the *Integrated Pest Management Regulation*:

> **No-treatment zone** means an area of land that must not be treated with pesticide.

The *Integrated Pest Management Regulation*, Sections 79(1) and (2), require the following NTZs. The NTZ applies to wells used for domestic or agricultural purposes, including water for livestock or for irrigation of crops.

To establish NTZs, BC Hydro measures the distance between the point of application of wood preservative and the water source. This means the horizontal distance from the high water mark of the body of water, dry stream, or classified wetland. (The high water mark is the highest area of land frequently wetted during a season of high water, i.e., the edge of the body of water at its highest wet point, usually marked by a break in terrestrial vegetation.) If the high water mark cannot be reliably identified (as in the case of puddles or small pools or water), it is measured from the level of the water.

## Table 3: Size of No-Treatment Zones

| Product | No-Treatment Zone (NTZ) * | | | | |
|---|---|---|---|---|---|
| **NTZ – Boron Products** | | | | | |
| | Fish bearing body of water<br><br>Fish-bearing wet or dry stream | Non-fish bearing body of water - wet | Non-fish bearing stream – dry | Water well | Point of diversion from water intakes (from any side where land slopes upward) |
| Boron rods[1] | 1 metre | 0 metres[2] | 0 metres[2] | 1 metre | 1 metre upslope |
| Timbor – liquid or powder, internal application | 1 metre | 0 metres | 0 metres | 1 metre | 1 metre upslope |
| CuBor ground line bandage | 3 metres | 1 metre | 1 metre | 10 metres | 10 metres upslope |
| [redacted] | | | | | |
| [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |

*** Notes:**

1 Boron rods include Cobra rods, and are listed in *Schedule 2 of the Integrated Pest Management Regulation*.

2 Solid internal preservatives (boron rods) can be used in locations that may be below the water table for portions of the year, provided they are not fish-bearing, not connected to fish-bearing, and not a wetland. Entry point of drill must be above water level.

3 [redacted]

## Riparian Issues and Fish

BC Hydro ensures that groundwater and riparian issues are discussed with and understood by each applicator. Its personnel will adhere to the following mitigation measures:

- Personnel will always use extreme caution when working around any body of water and not threaten the integrity of any body of water in the area. For example, personnel will be instructed to keep a minimum of 15 metres away from the body of water when:
  - refilling dispensing equipment
  - fuelling equipment
  - cleaning equipment
  - preparing below-ground pole bandages
- Poles sitting in water are inspected and treated only if permitted by the designated NTZs, see Table 3
- During below-ground inspections, if water fills the excavation (as a result of temporarily wet conditions), the below ground portion of the pole will be tested only, while either liquid or solid internal preservatives can be used in the above ground portion.
- Boron will not be applied if the pole is situated in a fish bearing stream.

## Watersheds, Wells, and Water Intakes

Many communities have designated watersheds where surface water is managed as the water source for the community. The Ministry of Environment defines a “community watershed” as a stream used for human consumption, where the stream is licensed as such by a community under the *Water Act,* and the drainage area is not more than 500 $km^2$. See Table 3 for the appropriate NTZ when working near water intakes for a community watershed.

In many BC communities, homeowners use private groundwater or surface water sources for domestic water, instead of a watershed. BC Hydro is restricted from applying wood preservatives within defined NTZs (as per Table 3) around wells and intakes.

## Groundwater Identification

To identify locations of groundwater sources (watersheds, wells, and surface water intakes), and to ensure NTZs are respected during test-and-treat work, BC Hydro has developed a groundwater source identification process to ensure that sources of groundwater are located before any wood preservative is applied. In summary, the procedure involves:

- identifying all known groundwater sources in advance of treatment, using the best available database information provided by the Ministry of Environment and local governments
- indicating groundwater sources on the database for the contractors
- physically searching around each pole for wells or groundwater sources, (1m search when using Boron/Cobra rods, 10m search when using [redacted] CuBor)
- contacting the owner of the groundwater source if a mapped source cannot be located in the field
- updating the groundwater source data in the database

### Wildlife and Habitat

Woodpeckers and other cavity-nesting species tend to be attracted to wood poles, because they are similar to standing dead trees, which woodpeckers prefer because of the presence of insects and grubs. Also, when the birds tap on poles, the electrical equipment produces echoing resonant frequencies, which woodpeckers exploit to attract mates.

BC Hydro's efforts are aimed at control of woodpecker damage (not control of woodpeckers themselves). This could involve restoring the strength of the pole, preventing further excavation by woodpeckers, tightening the equipment to reduce resonant frequencies, and preventing moisture from collecting in the cavity and increasing decay. Research in methods to deter woodpeckers from damaging power poles is currently underway.

Woodpeckers do not come into contact with remedial wood preservatives, because the birds attack the top sections of poles, while remedial preservatives are located at the bottom, below the surface. The fact that the preservative is sealed inside or next to the pole below ground means that small mammals and ground-foraging birds do not come into contact with it.

Birds rarely nest in wood poles. Since the tops of poles are not remedially treated, wood poles with a bird's nest on top can be remedially treated. When a wood pole with an osprey nest on top needs to be replaced, personnel will relocate the nest under BC Hydro's osprey nest relocation program.

*Protection of Food*

Research has shown that there is minimal to no leaching of wood preservatives into surrounding soil or water. Treatment is never undertaken in standing water, such as cranberry bogs.

In the vicinity of certified organic farms, it is the responsibility of the grower to maintain an 8m buffer zone between their organic crops and power poles. As recommended by the Certified Organic Associations of British Columbia (Standard #3, Land and Resource Management).

# Other Wood Structures

The vast majority of wood preservative use is in the Wood Pole Test & Treat Program. The remainder of wood preservative use is incidental, done on an ad hoc, as-required basis.

This section of the PMP fulfills the requirements of Section 58 of the *Integrated Pest Management Regulation* for other wood structures besides wood poles.

This section describes only the **program differences** between wood poles and other wood structures. If a subsection of Section 58 is not listed here, the required information is covered in the main *Program Description*. Also see that section for the Regulation text and general information.

## Where the PMP Applies: Section 58(1)(a)

BC Hydro manages hundreds of facilities throughout the province. A facility is a well-defined site, owned or leased by BC Hydro. It usually consists of electrical structures and buildings, and typically has limited public access. Some facilities are non-electrical, such as pole yards, storage yards, and access roads.

Types of facilities that may have wood structures include:

- **Electrical facilities** — substations, switchyards, capacitor stations, and cable termination sites.
- **Transportation facilities** — access roads, bridges, highway easements, and helipads.
- **Administration and works facilities** — office buildings, storage sheds, storage yards, and pole yards.

BC Hydro is allowed to manage these areas as per Section 20 of the *BC Hydro & Power Authority Act,* and as per right-of-way agreements.

Wood structures to be maintained consist of the following components:

**Cross-arms and timbers** — Conductors (wires) carrying the electricity from pole to pole are supported by insulators, which are attached to cross-arms. When two or more poles comprise a structure, they are usually connected to each other with one or more timbers to increase strength, stability, or both. Cross-arms and timbers are purchased pre-treated and are only treated as required.

**Pole and other storage racks** — Poles are stored on racks (bunks) so they are kept out of contact with the ground and are easy to pick up. Other types of wooden racks exist for storing pipe, wire, etc. These racks are often made of wood and need to be protected from decay.

**Duct bank/trench covers, walkways, ramps** — In substations and other facilities, underground ducts house a variety of equipment including cables and conduit. Although many of these ducts are covered with concrete pads, some are still covered with wooden pads. A variety of wooden ramps are used at facilities, including equipment loading and wheelchair access ramps. These wooden structures need to be protected from decay.

**Fence, sign and landscaping posts, timbers, ties, etc.** — Many facilities are fenced, landscaped, or have signs on site. The fence posts, landscaping timbers, and signposts are often wooden and need to be protected from decay.

**Buildings** — Wood preservation may be required for wooden components of buildings. However, this PMP does not cover the direct management of insects and rodents in buildings.

**Wood staves** — These are *not* covered under this PMP. The treatment of wood staves is a large, infrequently occurring project, and each wood stave has unique environmental concerns. Separate Pesticide Use Permits for the treatment of wood staves will be obtained on an as-needed basis.

## Prevention Program: Section 58(2)(a)

Planning the construction and using a “built to last” principle allows for wood structure designs that prevent organisms from becoming pests. BC Hydro’s wood structures are built with quality wood from the start to extend the life of the structure. This includes the use of decay-resistant cedar and pressure-treated lumber.

Painting the cut ends of treated wood at the time of construction can extend the service life of wood structures by 20%. This is the most common use of wood preservatives on wood structures.

Wood destruction from fungi is also minimized by good building practices.

## Identification of Pest Species: Section 58(2)(b)

Identification of potential problems at wood structures is done annually during regular facility safety inspections.

## Monitoring Program / Injury Thresholds: Section 58(2)(c)(d)

Monitoring of pest occurrence and damage, as well as environmental conditions, occurs annually during routine condition assessments.

The injury threshold is determined during safety inspections by qualified professionals. Injury thresholds for wood structures are related to engineering principles. The amount of sound wood remaining must be suitable to bear the load acting upon it, or it is considered unsafe. The engineering specifications tolerate very little rot in order to maintain the structural integrity of the wooden structure.

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## Evaluating Effectiveness: Section 58(2)(f)

Evaluation of treatment efficacy on wood structures is undertaken during regular safety inspections.

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## Treatment Methods: Section 58(2)(e)

Remedial treatment of wood structure surfaces uses applications of brushing grade wood preservatives containing *copper naphthenate* (or internal application of boron rods where feasible). The preservative is applied as a paste or liquid using a brush.

### *Treatment Rationale*

Some wooden structures at facilities typically use large timbers and are very expensive to replace; therefore, they warrant maintenance to further extend their service life. Although BC Hydro's "built-to-last" principle maximizes the service life of structures, follow-up treatments can extend it even further.

If treatment is required to reduce pests, a decision is made to either maintain the wood structure using wood preservatives, or replace the structure.

Wood preservatives will be applied by certified applicators, or under the direct supervision of a certified applicator in the structural wood category.

### *Benefits and Limitations*

Follow-up treatment with wood preservatives can extend the life of wood structures by two to three times.

There is little or no danger to the public from the preserved wood because BC Hydro's facilities are generally off limits to the public, or are located in remote areas.