
HEALTH & ENVIRONMENTAL RISK ASSESSMENT REPORT
FOR
“ECO ROD”

(DALRRD Reg. No: L7416, Act No: 36 of 1947)

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SHORT SUMMARY OF RISK ASSESSMENT REPORT OUTCOME

Because the use of the **Eco Rod** is restricted to industrial applications, i.e. “For industrial use”, it is not sold to the public and therefore poses no direct threat or risk to the general public. Exposure to the inorganic borates contained in the **Eco Rod** is therefore restricted to personnel involved in (i) the manufacturing of, and (ii) contractors involved in the application of these chemical rods to wooden poles in service. Potential risk of direct exposure to inorganic borates during the manufacture and application of wood preserving rods is manageable through the correct handling and use by properly trained people wearing appropriate PPE. The risk assessment report concluded that the risks associated with the use of the **Eco Rod** are considered manageable provided that its use is restricted to “**For industrial use**” as indicated on the currently approved label. Therefore, when manufactured and used in a controlled manner for the purpose it is meant for, there is no need for the **Eco Rod** to be phased out. It is also important to note that (i) the **Eco Rod** qualifies as “an exceptional circumstance where (except for **Vika Rod** that is aimed more specifically at the power transmission and distribution wood pole user markets that are represented by Eskom and the larger Metros) there is no other agricultural remedy available for its intended use”, and (ii) the continued registration and availability of the **Eco Rod** as a remedial and supplementary treatment for wooden poles is of significant economic importance as it extends its useful service life and thereby reduces the need for pole replacement, resulting in reduced pressure on our rather limited forest resources. It also greatly reduces the risk of unexpected pole failures, especially in critically important pole structures.

1. BACKGROUND

The new Regulations relating to Agricultural Remedies (No. 3812) under the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947), were promulgated on 25 August 2023 [1].

In a notification addressed to “All Regulatory Holders” that was circulated on 14 April 2022, the Registrar (Act No.36 of 1947) of the Department of Agriculture, Land Reform and Rural Development has stated his intention that, when renewal of registrations become due during 2024, he will pay special attention to pesticides that pose an unmanageable risk with an understanding that the use of those pesticides should be prohibited and phased-out, including active ingredients and their formulations that meet the criteria of carcinogenicity, mutagenicity and reproductive toxicity (CMR) categories 1A or 1B when classified according to the Globally Harmonized System of Classification and Labelling of Chemicals (“the GHS”).

However, regulatory decisions taken about the permissible use of a particular pesticide should be taken after carefully weighing up the benefits that they confer against any possible adverse effects. Regulatory decisions will involve risk assessment that will be evaluated by focusing on whether the health and environmental risks posed by the pesticide, when used as directed, are acceptable or not [1].

The Registrar may grant registration of an implicated agricultural remedy when the following conditions are met:

- The risk to humans, animals or the environment from exposure to the active substance in the agricultural remedy, under realistic worst-case conditions of use, is negligible.

- Not approving the active substance would have a disproportionate negative impact on society when compared with the risk to human health, animal health or the environment arising from the use of the substance [1].

The Registrar has indicated that the use of GHS Category 1A and 1B classified products may be exempt from prohibition in exceptional circumstances where the risk(s) presented by the product are manageable if used according to the label instructions and where there is no other agricultural remedy for the intended use[1].

A specific prerequisite under regulation 8.(7) of the new Regulations relating to Agricultural Remedy (No. 3812), is that a risk assessment report explaining why the use of a GHS Category 1A and/or 1B classified pesticide should not be prohibited in South Africa, must be published by the registration holder for public comment before applying for registration renewal of such a product. If successful, approval of such an agricultural remedy may be granted for a specified period and for restricted uses [1].

It is important to keep in mind that public exposure to chemicals that meet any of the criteria of CMR categories under the GHS requires careful assessment. Although the argument is about hazards in the CMR category according to the GHS, the deciding factor should be the likelihood of the risk of exposure to such chemicals. Therefore, risk assessments must be evaluated by focusing on whether the health and environmental risks posed by the pesticide, when used as directed, are manageable and acceptable.

Inorganic borates have been classified as a CMR Health hazard: Reproductive toxicity, GHS Category 1B (H360FD: May damage fertility or the unborn child) [2]. This report therefore deals with health and environmental risks and management of risks associated with inorganic borates, from manufacturing up to its end use as a wood preserving chemical product, in this case the **Eco Rod**. The report also considers whether there are exceptional circumstances that would permit the use of the **Eco Rod** and that, when used in accordance with the label instructions, its risk to human health and the environment is trivial and manageable, thereby meeting the necessary requirements for approval of the application for renewal of its current registration.

2. PRODUCT DETAILS

This risk assessment report is applicable to the following agricultural remedy/product:

2.1 Product trade name

“Eco Rod”

2.2 Product type

Boron-based wood preserving rod

2.3 Product description and use

The **Eco Rod** is a solid diffusible borate wood preserving rod for remedial and supplementary treatment of the untreated internal groundline portion of treated wooden poles in service to protect it against fungal decay and thereby extending its service life. The supply and use of the “**Eco Rod**” are aimed at the broader wooden pole user market, excluding the power transmission and distribution pole user. Please refer to NOTE below for more details.

2.4 Registration status

DALRRD Reg. No: L7416 (Act No: 36 of 1947)

2.5 Active ingredient

Contains inorganic borate in the form of disodium octaborate tetrahydrate.

2.6 Unique product feature

The inorganic borate active ingredient in **Eco Rod** has the unique feature of being able to penetrate any moist cellulosic material such as timber, whether permeable or impermeable, by the process of diffusion via the moisture in the material.

2.7 Registration holder

TimberLife (Pty) Ltd

31 Axle Street, Silverton Ext. 52, Pretoria

NOTE: The **Eco Rod** and **Vika Rod** are identical products. Marketing and supply of the **Eco Rod** is aimed at the broader wooden pole user market, excluding the power transmission and distribution pole users that are represented by Eskom and the larger Metros. In the latter case, the **Vika Rod** trade name was registered for marketing and supply of borate wood preserving rods to those specific markets.

3. RISK ASSESSMENT

3.1 CMR Health hazard classification

A full scientific rationale for the GHS classification of **Eco Rod** (DALRRD Reg. No. L7416), Report No 112-2022, Rev 1.0 was prepared by INFOTOX (Pty) Ltd [2]. This rationale not only forms the basis for the GHS classification of the **Eco Rod** but also for its revised Safety Data Sheet as amended.

Inorganic borates have been classified as a CMR Health hazard: Reproductive toxicity, GHS Category 1B (H360FD: May damage fertility or the unborn child) [2].

It is important to note that, although the GHS classification denotes inorganic borates as substances of concern, they are not banned substances, globally nor in South Africa.

3.2 Health risk assessment

Apart from being non-flammable, non-combustible and non-explosive, inorganic borates are of low acute oral and dermal toxicity and do not have any carcinogenic or mutagenic potential. The fact that they have been classified as GHS Category 1B substances with regards to reproductive toxicity, it is the only CMR health risk of concern. In this case the toxicological endpoints of concern arise from feeding studies in laboratory animals and relate to effects on fertility as well as developmental effects at high doses [2, 3].

Animal ingestion studies in several species, at high doses, indicate that borates cause reproductive and developmental effects [4]. A human study of occupational exposure to

borate dust showed no adverse effect on reproduction. A recent epidemiological study and a peer reviewing report of the past epidemiological studies conducted in China didn't show any negative effect of boron on human fertility [5]. A study conducted in Turkey with boron exposed mine workers showed that mean blood concentrations of the high exposure group is ~6 times and ~9 times lower than those of the highest no effect level of boron in blood with regard to developmental and reprotoxic effects (respectively) in rats. With those findings, no unfavourable effects of boron exposure on reproductive indicators are observed in humans [6,7].

Therefore, although prolonged over-exposure in the occupational setting may impact on fertility and the developing foetus, it should be noted that the GHS Category 1B classification is based on animal tests where animals were exposed to high doses of boric acid over long periods of time. These doses are multiple times higher than what humans are exposed to under conditions of normal handling and use [2, 8].

Developmental or fertility effects have never been demonstrated in human beings even among population groups with high exposure to borates. Borates do not accumulate in the body and are rapidly excreted with a half-life less than 24 hours [8].

A point of interest is the fact that inorganic borates have been safely used in household cleaning products such as detergents for nearly a century with no reported negative effects [8].

Because the **Eco Rod** is manufactured and supplied as a solid casted borate rod, during application there is:

- (i) virtually no risk of exposure to borate dust through inhalation,
- (ii) a relatively low risk of exposure through skin absorption,
- (iii) virtually no risk of eye irritation that may be caused by exposure to borate dust,
- (iv) a relatively low risk of exposure through oral intake.

Also of importance is the fact that, after the chemical rods have been inserted into the predrilled holes and sealed off with plastic plugs, the **Eco Rod** is completely embedded and sealed off inside the wooden pole and therefore inaccessible to any further physical contact.

3.3 Environmental risk assessment

Inorganic borates are naturally occurring in the ground and are widely distributed in the environment. Borates are essential micronutrients for the healthy development of all higher plants. In the case of borate poor or deficient soils, boron containing fertilizers are administered in small quantities to ensure healthier plant growth [8].

However, large amounts of inorganic borates can be harmful to plants and other species. Therefore, the product should only be used as part of a balanced plant nutrition program, preferably after soil and/or tissue analysis. Accidental releases to the environment should be avoided or at least minimized [3].

The water solubility of borates also means that they are widely dispersed and do not bio-accumulate in the environment. In the case of a spill, the rate at which inorganic borates will be dispersed in soil will depend on the soil type, the soil moisture content and the amount and concentration of the spill [8].

A classification of hazardous to the aquatic environment, over acute or chronic periods of exposure, is not proposed for the **Eco Rod** in the rationale for the GHS classification of **Eco Rod** that was done by Fourie [2]. It is further noted that none of the ingredients, including the disodium octaborate tetrahydrate active ingredient, are classified as acute chronic hazards to the aquatic environment.

4. RISK MANAGEMENT

4.1 Manufacturing process

The **Eco Rod** is manufactured inside the Timberlife factory building in a dedicated air-conditioned room, that can be separated from the rest of the factory with a double door.

A Production Control Sheet detailing the required mixing instructions and procedures as well as a list of essential personal protective equipment to be worn is issued and signed off for each batch of product manufactured.

Only fully trained staff are allowed to take part in the manufacturing process. Full protective clothing, rubber gloves, dust masks and face shields are worn during the mixing and casting phases of the manufacturing process.

Section 8 of the Occupational Health and Safety Act, Act No. 85 of 1993 stipulates that employers in South Africa shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to employee's health. In this regard, TimberLife (Pty) Ltd has appointed an accredited company, specializing in occupational health and safety requirements, to draw up and manage a formal occupational health risk management plan for the company that outlines occupational hazards and risks, exposure monitoring, and medical surveillance, in accordance with the Regulations outlined in Section 4 [9].

4.2 Packaging and transport

Inorganic borates are not classified as acutely toxic by inhalation, oral or dermal exposure. Therefore, these substances are not dangerous for transport and no special precautionary transport measures are necessary. (For more details, please refer to the "Transport Information" section of the Safety Data Sheet for the **Eco Rod**).

No specific packaging group has been assigned under UN transport regulations.

4.3 Handling and use of the Eco Rod

The **Eco Rod** is registered "For industrial use" only. It is therefore used in restricted industrial applications and is not available for purchase and use by the general public.

Both the Safety Data Sheet and the product label for the **Eco Rod** have been revised in accordance with the guideline on the implementation of the Globally Harmonized System of the classification and labelling of chemicals, issued by the Department in March 2022 [10]. The Safety Data Sheet and product label information serve to ensure that management of the product in all its applications will be safe and in accordance with the relevant health and environmental requirements.

As already mentioned, the **Eco Rod** is marketed and supplied to the broader wooden pole user market, excluding the power transmission and distribution pole users such as Eskom and the larger Metros.

The box label for the **Eco Rod** clearly stipulates the following:

- READ THE LABEL BEFORE USE
- KEEP OUT OF REACH OF CHILDREN, UNINFORMED PERSONS AND ANIMALS

The enclosed pamphlet also provides clear “DIRECTIONS FOR USE” to ensure that the chemical rod treatments are done strictly in accordance with the chemical rod manufacturer’s prescribed directions for use and the recommended **Eco Rod** application rates

Apart from all the necessary “WARNINGS”, the following are some of the more important “PRECAUTIONS” that are prescribed on the box label:

- Obtain, read and follow all safety instructions before use.
- Wear protective gloves when handling. In addition to gloves, wear protective work clothing and eye or full-face protection during installation of the rods.
- Wash hands and exposed skin thoroughly after handling and use. Do not touch eyes.

The above demonstrates that the risk of direct exposure to the raw materials used in the manufacturing process as well as /during the handling and use of the **Eco Rod** itself, is and can be safely and well managed.

4.4 Exposure to the Eco Rod chemicals after application

After the chemical rods have been inserted into the predrilled holes and sealed off with plastic plugs, the **Eco Rod** is completely embedded and sealed off inside the wooden pole and therefore inaccessible to any further physical contact.

NOTE: A revised South African National Standard on the inspection and supplemental treatment of treated wooden poles in ground contact, SANS 10324, Ed 2 is to be published before the end of 2024. This standard covers the in situ remedial and supplementary treatment of all treated wooden poles to protect it against internal fungal decay, including poles used in power transmission and distribution lines, street lighting as well as for other purposes such piling, structural and agricultural uses, shade netting, fencing, building and foundations [11].

5. EXCEPTIONAL CIRCUMSTANCE

Under regulation 8. (6), the Registrar has indicated that the use of GHS Category 1A and 1B classified products may be exempt from prohibition “... *in exceptional circumstances, where there is no other agricultural remedy for the intended use* ...” [1].

Diffusible wood preserving rods are used specifically for remedial and supplementary treatment of the untreated internal portion of wooden poles in service to protect it against fungal decay. Inorganic borates are one of only two known chemical substances that can diffuse and move through moist wood to arrest and prevent fungal decay.

The only other diffusible alternative active ingredient is sodium fluoride. However, apart from being much more toxic and with a lower fungicidal efficacy than sodium borates, sodium fluoride has not been registered as a standalone diffusible wood preserving compound anywhere in the world.

As far as the availability of alternative products for the same intended end use is concerned, there are no other diffusible wood preserving rods registered, both locally and internationally, that do not contain sodium borate sodium borate as the active ingredient or as part of the active ingredients, which certainly makes this case an exceptional circumstance.

6. ECONOMIC IMPORTANCE

The **Eco Rod** is used as a supplementary maintenance treatment for the untreated internal portion of treated wooden poles to extend its service life. Together with the **Vika Rod**, the **Eco Rod** is one of only two locally manufactured and DALRRD registered products that are available and approved in South Africa for this purpose.

Regular supplementary maintenance treatment of the groundline portion of wooden poles in service can avoid unexpected pole failures. In the case of wooden poles used in critically important structural applications such as pilings or foundation poles for permanent buildings, unexpected pole failures that can result collapse of part of or the entire building with devastating and life-threatening consequences.

By extending the service life of wooden poles used in ground contact through regular application of supplementary treatment products such as the boron-based wood preserving rods, the pressure on our rather limited forest resources is also greatly reduced.

In South Africa, the economic benefits derived from the use of chemical rods as a remedial and supplementary maintenance treatment for Eskom's wooden poles have been proven by a successful track record of well over 20 years with huge economical savings in pole replacement costs.

7. DISCUSSION

The potential risks of exposure during manufacture and application of wood preserving rods to wooden poles are manageable through the correct handling and use by properly trained personnel and wearing of the required PPE. Incidental exposure of members of the general public to boron-based wood preserving rods such as the **Eco Rod** in the outdoor environment, is also extremely unlikely and may be disregarded.

Exposure to inorganic borates is therefore limited to personnel involved in the manufacture of the boron-based wood preserving rods and those involved in the application of these chemical rods to wooden poles in service.

Also, as reviewed in in this report, there are no viable alternatives to replace borates in the applications where it is currently used.

In summary, health as well as environmental risks associated with the manufacture, handling and use of the **Eco Rod** are effectively managed through safe work procedures, engineering controls, personal protective equipment, worker training, good housekeeping, and occupational health risk management. It is also important to note that the use of the **Eco Rod** is restricted to industrial applications, i.e. "For industrial use only" and it is therefore not available for purchase and use by the general public.

8. CONCLUSIONS

The risk assessments done show that the **Eco Rod**, classified as GHS Category 1B hazardous boron-based chemical product, poses no direct threat to the general public. It is also important to note is that the use of the **Eco Rod** is restricted to industrial applications, i.e. "For industrial use only". Exposure to inorganic borates is restricted to personnel involved in the manufacturing of, and contractors involved in the application of these chemical rods to wooden poles in service. The potential risk of direct exposure to inorganic borates during the manufacture and application of these wood preserving rods is manageable through the correct handling and use by properly trained people wearing appropriate PPE. Furthermore, there is no clear evidence that occupational exposure to inorganic borates in practice poses a reproduction risk to humans. Therefore, when manufactured and used in a controlled manner for the purpose it is meant for, there is no need for the **Eco Rod** to be phased out.

Although inorganic borates are substances of concern (Reproductive toxicity – GHS Category 1B), the risk of exposure to these substances when handled and used in accordance with the label instructions, is minimal. The risks associated with using the **Eco Rod** are therefore considered manageable provided that its use is restricted to "**For industrial use**" as indicated on the currently approved label.

It is also important to note that, after treatment the chemical rods are completely embedded and sealed off inside the wooden pole and therefore inaccessible to any further physical contact.

The **Eco Rod** clearly qualifies as "an exceptional circumstance as, apart from the **Vika Rod**, there is no other alternative locally manufactured agricultural remedy available for the intended use" and its use should therefore not be prohibited.

Furthermore, the continued registration and availability of the **Eco Rod** as a remedial and supplementary treatment for wooden poles is of significant economic importance. It extends its useful service life and thereby reduces the need for pole replacement, resulting in reduced pressure on our rather limited forest resources. It also greatly reduces the risk of unexpected pole failures, especially in critically important pole structures.

9. RECOMMENDATION

In the light of the above risk assessment and motivation for its continued use, it is recommended that the application for renewal of the **Eco Rod** registration (DALRRD Reg. No: L7416) be considered favourably for approval of its continued use in accordance with the label conditions and directions for use.

10. REFERENCES

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