ANNEX XV RESTRICTION REPORT

PROPOSAL FOR A RESTRICTION

SUBSTANCE NAME(S): Creosote; wash oil [1], Creosote oil; wash oil [2], Distillates (coal tar), naphthalene oils; naphthalene oil [3], Creosote oil, acenaphthene fraction; wash oil [4], Distillates (coal tar), upper; heavy anthracene oil [5], Anthracene oil [6], Tar acids, coal, crude; crude phenols [7], Creosote, wood [8], Low temperature tar oil, alkaline; extract residues (coal), low temperature coal tar alkaline [9]

EC NUMBER(S): 232-287-5 [1], 263-047-8 [2], 283-484-8 [3], 292-605-3 [4], 266-026-1 [5], 292-602-7 [6], 266-019-3 [7], 232-419-1 [8], 310-191-5 [9]

CAS NUMBER(S): 8001-58-9 [1], 61789-28-4 [2], 84650-04-4 [3], 90640-84-9 [4], 65996-91-0 [5], 90640-80-5 [6], 65996-85-2 [7], 8021-39-4 [8], 122384-78-5 [9]

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Summary

The restriction proposal aims at reducing health and environmental risks associated with the reuse and second-hand use of wood treated with creosote (CAS 8001-58-9, EC 232-287-5) and creosote-related substances. Moreover, the proposed restriction amending entry 31 of REACH Annex XVII aims at ensuring proper articulation of Biocidal Product Regulation (BPR) (EU) 528/2012 and REACH with regards to creosote, substance approved as a biocidal active substance for the treatment of wood, and creosote related substances. This proposal also aims at fulfilling the REACH regulation requirement when safeguard clause article 129 is triggered by a European Member State, because a restriction proposal is mandatory to maintain the restrictive regulation measures taken by France.

Creosote Grade B and Grade C as specified in European Standard EN 13991:2003 is a biocidal active substance used for wood protection (Product Type 8) regulated under Biocidal Product Regulation (BPR) (EU) 528/2012. Assessment of health and environmental risks related to the substance, the products containing the substance and the articles treated with it and first placed on the market in the meaning of BPR is the remit of the BPR (making available on the market' means any supply of a biocidal product or of a treated article for distribution or use in the course of a commercial activity, whether in return for payment or free of charge as defined in chapter 1 article 3 (1i) of Regulation (EU) No 528/2012). It is classified under EC Regulation 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP regulation) as carcinogen category 1B. In the context of the renewal of the approval of the active substance, the Biocidal Product Committee (BPC) concluded in its opinion adopted on 4 December 2020 that creosote meets the criteria for being PBT and vPvB. Classification of the substance as toxic for reproduction category 1B is also proposed by the BPC. The BPC concluded that creosote meets several exclusion criteria of the BPR and that no safe uses of creosote and creosote-treated woods can be identified when combining the outcomes of human health and environment risk assessment.

Due to the scope of BPR, reuse and secondary use as well as placing on the second-hand market of creosote-treated wood are in the remit of REACH. This situation engendered a gap in risk assessment of wood treated with these substances for their full service life. Because there is no dedicated data on exposure regarding placing on the second-hand market, reuse and secondary use, it is assumed that risks from reuse and reuse after placing on the second hand market that are in the scope of the restriction dossier are similar to the initial unacceptable risks demonstrated by BPC and do not dissipate or increase along time.

This restriction proposal has to take into account three regulations: REACH Regulation No 1907/2006, Biocidal Products Regulation No 528/2012 (BPR) and the Waste Framework management Directive No 2008/98/EC (WFD). A significant amount of information presented in this document concerning hazard, exposure/emissions and risk comes from the Renewal Assessment Report (RAR) adopted by the BPC as the concerned substance is regulated as a biocidal active substance, is formulated inside several products and used for the treatment of wood articles and first placed on the market under BPR.

Creosote first was approved as a biocidal substance in 2011 under Directive 98/8/CE (in force prior BPR entry into force) for a period of 5 years and its approval was postponed to October 2022. Based on BPC opinion, discussion are currently ongoing between European Commission (COM) and Competent Authorities (CA) for Biocides on the conditions for renewal of creosote approval under BPR. COM decision on creosote approval renewal is not available yet. Creosote was approved as an active substance for PT 8, however, it does not cover all the substances

included in the current restriction entry 31 Annex XVII of REACH. On the nine substances covered by the current restriction, creosote is the only one approved under BPR and covered by a proper risk assessment. Wood articles treated with other substances than creosote itself shall not be placed on the market anymore. Consideration of reuses and secondary uses of a primary use that does not exist – or are not allowed - do not seem relevant. However, because wood–treated in the past with the other substances currently mentioned in the entry 31 may are still in use, they are kept in the scope of the new entry 31 to restrict their second-hand market, reuses and secondary-uses similarly to creosote. The authorisation of creosote-based products to treat wood under BPR has led and may lead in the future, depending on renewal decision, to the presence of hazardous articles on the market in the EEA which utilisation, trade, free transfer and disposal are difficult to control. This also applies to creosote treated-wood put on the market before 2002 as they have not been banned. Awaiting the decision on the active substance in the framework of BPR, French authorities have decided to use safeguard clause article 129 of REACH by adopting a national regulatory provision on 18th December 2018, thus creating the need for this restriction dossier.

The proposed restriction is developed in parallel to ongoing discussions on the renewal of approval of creosote as a biocidal active substance. This proposal aims at fulfilling REACH regulation obligation (art. 129(3)) when safeguard clause article 129 is triggered. It is based on the current BPC opinion date 04 December 2020 and RAR dated 14 January 2021. Considering the scope of the renewal of creosote approval, ongoing discussions among competent authorities -based on data collected during consultations on derogation to BPR exclusion criteria- highlighted that creosote use will, with high probability, be restricted to treatment of wood used as railway sleepers and support poles at national levels, with the possibility for Member states to further restrict the use of creosote treated wood, depending on their national context. Taking into account this expected narrow scope of approval, the proposed restriction only focuses on creosote treated-wood for railway sleepers and treated timber for support poles reuse, as secondary uses and second-hand uses would be banned. The Dossier Submitter (DS) underlines that these conditions, where a stabilised position on the upstream part of the market's regulation is awaited when preparing the regulation of the downstream part is not favorable to a sound assessment of risks and/or socio-economic impacts of the uses to be considered. Nevertheless, the DS reminds that, whatever option will be finally endorsed by COM (after analysis by the risk assessment committee (RAC) and socio-economic analysis committee (SEAC)) it seems necessary to reduce the scope of the currently applicable restriction under REACH (entry 31), in accordance with the most recent evaluations under BPR and knowledge on the substance.

Based on the RAR on creosote, BPC Opinion, Member State consultation, national railways manager hearing and consultations, it has been concluded that restriction of secondary-uses of creosote treated-wood articles under REACH is the most appropriate Risk Management Option (RMO). Moreover, the situation regarding reuse of creosote-treated wood was also examined through an analysis of the effectiveness, proportionality, practicality and monitorability of two Restriction Options (ROs):

RO1: Restriction of all reuses and secondary-uses of creosote-treated wood authorised under BPR and already placed on the market.

RO2: Restriction of all secondary-uses of creosote-treated wood and authorisation of reuse for creosote-treated wood authorised under BPR solely for the same use (as primary use) under similar condition and by the same original user.

The socio-economic analysis was actually performed for RO2. Indeed, RO1 appears not fully complying with WFD recommendations regarding hierarchy of waste that shall prioritise reuse and recycling before energetic recovery or disposal when possible, nor with European Commission sustainable growth strategy developed under the Green Deal agenda; RO1 is considered over restricting treated-wood determined as good state and quality, identical to initial requirement for first placing on the market.

As stated above, only railways sleepers and support poles were considered in the proposed restrictions. According to hearings performed, reuse of support poles was reported to be impossible due to the degradation of the treated wood at the end of the service life and damage when posts were removed. Regarding railways sleepers, the additional costs incurred by national railway infrastructure managers (NRIMs) due to the proposed restriction can be considered as marginal (SNCF hearing) and this restriction is unlikely to affect these companies and their activities significantly. Besided, the risk of negative economic impact of the proposed restriction on private railway managers appears uncertain to the DS given the uncertainties in the parameters considered. The DS considers the economic impacts of the restriction to be affordable if the substitution of reused sleepers is based on new creosoted wooden sleepers. Indeed, in most of the scenarios considered in its assessment and if the substitution is spread over time, extra-costs of such a substitution can be considered as moderate (this option strongly depend on the issuance of an approval for the substance under the BPR. The issuance of such an approval is considered likely by the DS at the time of preparation of this dossier). If creosote use were not allowed anymore under the BPR, the DS considers that a substitution based on new wooden sleepers treated with copper hydroxide would result in affordable economic impacts. A decrease in acquisition cost of new wooden sleepers treated with copper hydroxide is considered likely by the DS. Indeed, oil-based copper hydroxide biocidal products are likely to be used by EU NRIMs within the coming years, which should lead to such a price decrease.

Moreover, according to the DS, the professionalization process underway in the tourist rail sector and the role of local authorities in financing these infrastructures (at least in the French context), contributes to the affordability of the additional cost. The risk of negative economic impacts on consumers could not be assessed by the DS. The DS also expects the public consultation to provide additional elements on these issues.

Regarding risk reduction of the proposed restriction, the DS was not able to quantify the environmental and human health benefits of the proposed restriction. The proposed restriction covers the management of articles treated with biocidal product authorised under BPR and already placed on the market in the meaning of REACH. By solely managing already treated articles, the proposed restriction options will only lead to partly decrease the identified risks for the corresponding (re)uses under REACH. By clarifying the interconnection between REACH and BPR, this restriction proposal aims at clarifying and reducing the scope and conditions of reuse and totally manage secondary uses and second-hand market. In that sense, it will help reducing the risk under REACH of reuse and will totally manage and remove risks engender by secondary uses and trade under second-hand market.

Exposure of professionnal will remain and exposure of the environment will occur through services life of creosote-treated wood. The risk reduction will mainly arise by decreasing exposure of professionnal and non-professionnal operating in the removal of old treated-wood through the prohibition of secondary uses for creosote-treated wood. It would also allow to avoid the most of the exposition of general population. Even when considering the most restrictive option, RO1 which prohibits all second-hand market, reuse and secondary uses of treated wood, the exposition linked to authorisation of products containing the substance and

uses under BPR will remain, and potentially even increase if freshly creosote-treated wood is the alternative preferred by operators to old creosote-treated wood.

The proposed restriction must include the following conditions:

- Ban of the placing on the market (and importation) of all treated-wood with active substance creosote and substances covered by the entry 31 at the exemption of creosote (Grade B and Grade C creosote as specified in European Standard EN 13991:2003, EC:232-287-5, CAS: 8001-58-9) specifically approved under BPR.
- Creosote treated-wood will be authorized to be reused solely by the same economic actor and for the same use as specifically allowed under BPR (e.g. railways sleepers reused as railway sleeper, communication pole reused as communication pole).
- To help the enforceability and monitorability, it is suggested that a permanent labeling of creosote-treated wood with the appropriate information regarding hazards, risk mitigation measure and allowed follow-up of treated articles is discussed under BPR while authorizing the first-placing on the market.
- All end of life creosote treated-wood (even those treated before December 2002) must be disposed under the Waste Framework Directive (WFD, 2008/98/EC) for hazardous waste.
- No secondary use and second-hand market of Creosote treated-wood will be authorized, even for creosote treated-wood before December 2002. The creosote treated-wood already used in secondary application will need to be disposed under the Waste Framework Directive (WFD, 2008/98/EC) and this has to be encouraged.

The dossier submitter in addition notes:

- That many provisions of the current entry are in the scope of the biocidal use of the substances (e.g. chemical composition, packaging and labelling specifications for creosote substance detailed in point 2 of entry 31, specifications of restricted area for treated wood with substance of entry 31 detailed in point 3);
- Such provisions shall appropriately be included in the BPR regulation as it will clarify the scope of each regulation and simplify the application and enforcement of the provisions.

Proposed restriction

On the basis of an analysis of the effectiveness, proportionality, practicality and monitorability of RO1 and RO2, and the impact assessment performed, the following restriction is proposed:

Proposed Restriction: RO2

Table 1: Proposed amendments for Annex XVII entry 31 for the restriction of creosote and related substances

Substances	Conditions of the restriction
(a) Creosote; wash oil CAS No 8001-58-9 EC No 232-287-5 (b) Creosote oil; wash oil CAS No 61789-28-4 EC No 263-047-8	1. Wood treated with such substances shall be placed on the market in the conditions and derogations defined by the BPR. 2. Wood treated with such substances and placed on the market in accordance with paragraph 1: a. shall not be reused or subject to secondary use ;

(c) Distillates (coal tar), naphthalene oils; naphthalene oil CAS No 84650-04-4 EC No 283-484-8 (d) Creosote oil, acenaphthene fraction; wash oil CAS No 90640-84-9 EC No 283-484-8 EC No 292-605-3 (e) Distillates (coal tar), upper; heavy anthracene oil CAS No 65996-91-0 EC No 266-026-1 (f) Anthracene oil CAS No 90640-80-5 EC No 292-602-7 (g) Tar acids, coal, crude; crude phenols CAS No 65996-85-2 EC No 266-019-3 (h) Creosote, wood CAS No 8021-39-4 EC No 232-419-1 (i) Low temperature tar oil, alkaline; extract residues (coal), low temperature coal tar alkaline CAS No 122384-78-5 EC No 310-191-5	b. shall not be placed on the second-hand market. 3. By way of derogation to paragraph 2.a, wood treated with such substances can be reused for the same use, under similar conditions and by the same original user. 4. Once considered as waste, treated wood referred to under paragraphs 1 and 3 should be handled as hazardous waste according to the waste directive framework 2006/12/EC (Art. 17). 5. The restriction shall apply 12 months after its entry into force

If creosote uses were not allowed after the ongoing BPR renewal process for creosote such a decision may lead to reconsider the reuse of creosote-treated sleepers and a dedicated assessment should be made. In that case, the DS considers RO1 as providing the best risk management provision by ensuring consistency of regulations and prohibiting second-hand market, secondary uses and reuse of creosote-treated wood already available in the market for which authorisation would not be granted anymore.

Report

1. The problem identified

1.1. Regulatory context and target of the restriction

Creosote (CAS 8001-58-9, EC 232-287-5) and creosote-treated wood are subjected to several regulatory provisions.

Creosote Grade B and Grade C as specified in European Standard EN 13991:2003 is classified as carcinogen category 1B, H350 (may cause cancer) under EC Regulation 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP regulation)[1]. In addition, creosote contains a complex mixture of persistent, bioaccumulative and toxic polycyclic aromatic hydrocarbons (PAHs) and is therefore also recognized as a PBT and vPvB substance (persistent, bio-accumulative and toxic, very persistent and very bioaccumulative).

Creosote is not registered under Regulation (EC) No 1907/2006 of 18 December 2006 (REACH)[2]. It is used exclusively in Europe as a biocidal active substance in "Wood Preservatives" products (Product Type 8 within the meaning of the Biocidal Products Regulation (BPR) (EU) No 528/2012)[3]. The approval of creosote as a biocidal substance, the placing on the market and use of creosote-based biocidal products, and the first placing on the market of creosote-treated wood is in the remit of this regulation.

Creosote-related substances used as biocidal product to treat wood and covered by entry 31 of REACH Annex XVII have been added, together with creosote, to the Council Directive 76/769/EEC[4] of 27 July 1976 on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations by the Directive 94/60/EC[5] of 20 December 1994 amending for the 14th time Directive 76/769/EEC and Commission Directive 2001/90/EC of 26 October 2001[6] providing the final technical details of the current REACH restriction entry 31 regarding creosote and creosote-related substances. This entry number 31 specifies the conditions for their use in wood treatment and for the first placing on the market of treated-wood (see Table 2). Creosote is the only one approved under BPR and covered by a proper risk assessment. Wood-treated with other substances than creosote itself shall not be placed on the market anymore. Conditions mentioned in paragraph 2 define in which cases the substances can be used for wood treatment. These provisions of the entry 31 relate to uses in the scope of the BPR. However, because wood–treated in the past with the other substances currently mentioned in the entry 31 may already be in use, they are kept in the scope of the entry 31 to restrict their second-hand market, reuses and secondary-uses similarly to

[1] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32008R1272

[2] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006R1907&from=en

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012R0528

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:31976L0769&from=FR

[5] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31994L0060

[6] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32001L0090

creosote. It also establishes a derogation for the use and secondary-hand market of wood treated before 31 December 2002 and placed on the market for reuse.

Table 2: Entry 31 of REACH Annex XVII

Entry 31. (a) Creosote; wash oil CAS No 8001-58-9 EC No 232-287-5 (b) Creosote oil; wash oil CAS No 61789-28-4 EC No 263-047-8 (c) Distillates (coal tar), naphthalene oils; naphthalene oil CAS No 84650-04-4 EC No 283-484-8 (d) Creosote oil, acenaphthene fraction; wash oil CAS No 90640-84-9 EC No 292-605-3 (e) Distillates (coal tar), upper; heavy anthracene oil CAS No 65996-91-0 EC No 266-026-1 (f) Anthracene oil CAS No 90640-80-5 EC No 292-602-7 (g) Tar acids, coal, crude; crude phenols CAS No 65996-85-2 EC No 266-019-3 (h) Creosote, wood CAS No 8021-39-4 EC No 232-419-1 (i) Low temperature tar oil, alkaline; extract residues (coal), low temperature coal tar alkaline CAS No 122384-78-5 EC No 310-191-5	1. Shall not be placed on the market, or used, as substances or in mixtures where the substance or mixture is intended for the treatment of wood. Furthermore, wood so treated shall not be placed on the market. 2. By way of derogation from paragraph 1: a) The substances and mixtures may be used for wood treatment in industrial installations or by professionals covered by Community legislation on the protection of workers for in situ retreatment only if they contain: (i) benzo[a]pyrene at a concentration of less than 50 mg/kg (0,005 % by weight), and (ii) water extractable phenols at a concentration of less than 3 % by weight. Such substances and mixtures for use in wood treatment in industrial installations or by professionals: - may be placed on the market only in packaging of a capacity equal to or greater than 20 litres, - shall not be sold to consumers. Without prejudice to the application of other Community provisions on the classification, packaging and labelling of substances and mixtures, suppliers shall ensure before the placing on the market that the packaging of such substances and mixtures is visibly, legibly and indelibly marked as follows: 'For use in industrial installations or professional treatment only'. b) Wood treated in industrial installations or by professionals according to subparagraph (a) which is placed on the market for the first time or retreated in situ may be used for professional and industrial use only, for example on railways, in electric power transmission and telecommunications, for fencing, for agricultural purposes (for example stakes for tree support) and in harbours and waterways. c) The prohibition in paragraph 1 on the placing on the market shall not apply to wood which has been treated with substances listed in entry 31 (a) to (i) before 31 December 2002 and is placed on the second-hand market for reuse. 3. Treated wood referred to under paragraph 2(b) and (c) shall not be used: - inside buildings, whatever their purpose, - in toys, - in playgrounds, - in parks, gardens, and outdoor recreational and leisure facilities where there is a risk of frequent skin contact, - in the manufacture of garden furniture such as picnic tables, - for the manufacture and use and any re-treatment of: - containers intended for growing purposes, - packaging that may come into contact with raw materials, intermediate or finished products destined for human and/or animal consumption, - other materials which may contaminate the articles mentioned above.

Several uses are reported under REACH as intermediate or as substance of interest on their own. These information are detailed in section 1.2.4.2. However, **these substances are not authorised under BPR**.

Articles treated with the substances restricted by entry 31, when coming to the end of their life, fall within the scope of the Directive 2008/98/EC[7] of the European Parliament and of the Council of 19 November 2008 on waste. Creosote, and substances of entry 31 are considered as hazarouds waste as they are classified as Carcinogenic 1B, H350, meeting the criteria set out in Annex III of the Directive 2008/98/EC. Due to this classification in regards to the hazards to human health, a waste that contains a substance classified by this hazard class and category codes and hazard statement codes and that exceeds the concentration limits (0.1%) shall be classified as hazardous by HP 7 (HP7 Carcinogenic: waste which induces cancer or increases its incidence). In consequence, by means of article 17 and following of the Directive 2008/98/EC, treated articles with creosote and substances covered by entry 31 shall be considered and processed as hazardous waste.

Creosote was initially approved as a biocidal substance under the Biocidal Products Directive 98/8/CE, which was later reapealed by the BPR, for several uses of wood treatment at European level in 2011 (Directive 2011/71/EU)[8], with effect from May 1st, 2013, for a period of 5 years, up to April 30th, 2018. This expiry date was postponed three times by Commission implementing decisions 2017/2334, 2020/1038, 2021/1839, and is currently set to October 31st, 2022[9].

Authorisations of biocidal products containing creosote and used to treat wood are granted at a national level. As with all biocidal products, conditions detailed in article 19 of BPR must be fulfilled. Moreover, in view of creosote hazard profile, biocidal products containing creosote may only be authorised for uses where the authorising Member State concludes that there are no suitable substitute products. This decision shall be based on the analysis of the technical and economic feasibility of the substitution, as well as any other information available, in accordance with the annex of 2011/71/EU.

In addition, any approval of biocidal products containing creosote by a national authority is currently subjected to the following conditions as specified by Directive 2011/71/EU:

1 – Creosote may only be used under the conditions set out in Annex XVII, line 31, second column, point 2 of Regulation (EC) No 1907/2006
2 – Creosote must not be authorised for the treatment of wood for the uses referred to in Annex XVII, line 31, second column, point 3 of Regulation (EC) No 1907/2006
3 – Appropriate risk mitigation measures must be taken to protect workers, including downstream users, from exposure during wood treatment and handling of treated wood (...)
4 – Appropriate risk mitigation measures must be taken to protect soils and waters. In particular, the labels and, if provided, the safety data sheets of the authorised products shall indicate that the freshly treated wood must be stored under shelter or on a waterproof hard surface, or both, to avoid losses directly in soils or waters and that losses must be recovered for reuse or disposal

[7] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008L0098-20180705

[8] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011L0071

[9] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021D1839&from=EN

BPR provisions for creosote refers to REACH entry 31 of Annex XVII for dispositions related to uses in the remit of the BPR.

Currently, 53 creosote-based products are authorised variously in 21 EEA members and in UK[10,11].

In the context of the on-going process of revision of creosote approval, the Biocidal Product Committee (BPC) adopted on 4 December 2020[12] an opinion on the application for renewal of the approval of the active substance creosote for product-type 8.

It was concluded that, based on CMR and PBT/vPvB properties, creosote does meet the exclusion criteria and is considered as a candidate for substitution. **In addition, based on risk assessment, it was concluded that no safe uses can be identified when combining the outcomes of the human health and environment risk assessment.**

The approval of creosote in product-type 8 should normally not be renewed, unless one of the conditions for derogation in Article 5(2) of BPR is met (ECHA/BPC/274/2020), i.e.:

- the risk to humans, animals or the environment from exposure to the active substance in a biocidal product, under realistic worst-case conditions of use, is negligible, in particular where the product is used in closed systems or under other conditions which aim to exclude contact with humans and release into the environment;
- there is evidence that the active substance is essential to prevent or control a serious danger to human health, animal health or the environment; or
- 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.

The process related to the demonstration of whether the conditions for derogation set in Article 5(2) of BPR are met, is currently under discussion between the Commission and the Member states within the Standing Committee on biocidal products to conclude on a possible renewal of creosote and on the scope of such a renewal.

In this case, approval of creosote may be granted for a maximum period of five years. In addition, Member States, may only authorise biocidal products where they consider that conditions of Article 5(2) of BPR are met on their territory.

The regulation of the reuse and placing on the second-hand market of creosote-treated wood authorized under BPR is in the remit of the REACH regulation and, as currently established, entry 31 of Annex XVII of REACH allows:

- The free movement of processed articles (such as poles, fences…) in European Union, even though a Member State has decided not to authorize its use as a Biocidal product;
- The reuse of those treated articles, for the same purposes or for other uses;

[10] https://echa.europa.eu/information-on-chemicals/biocidal-active-substances/-/disas/factsheet/19/PT08

[11] https://ec.europa.eu/health/biocides/creosote_en

[12] https://echa.europa.eu/documents/10162/fc41edcf-3732-2ba9-6a14-0fb9b423fd6c

- The use of wood treated before 31 December 2002 and their reuses and secondary uses (see section 1.2);

It is considered that this situation increases the situations of unacceptable risks for human health and the environment. It is also not consistent with the provisions of BPR.

Indeed, the risks identified by the BPC for the initial use of creosote treated-wood are also relevant for reuses and secondary use of creosote treated-wood (see definitions of these terms below).

The approval of creosote should normally not be renewed due to its hazard profile, unless one of the conditions for derogation in Article 5(2) of BPR is met. The derogation granted for the authorisation of creosote-treated wood has led and may lead in the future depending on renewal decision, to the presence of hazardous articles after their first placing on the market in the EEA for which utilisation, trade, free transfer and disposal are difficult to control.

Awaiting the decision on the active substance under regulation 528/2012, French authorities have decided to use safeguard clause Article 129 of REACH by adopting a national regulatory provision[13].

In addition, an overlap of both the BPR and the REACH provisions is noted, as condition of use and placing on the market of creosote for the treatment wood, i.e. for its biocidal use is mentioned in paragraph 2 of Annex XVII entry 31 of REACH, and BPR refers to this entry. This creates an unnecessary complexity of regulatory provisions and may hamper their appropriate application and enforcement.

This Annex XV dossier aims at:

- Drastically decrease reuse by non professional and non trained professional and completely prohibit second-hand market and secondary-uses of hazardous articles and increase protection of human health and the environment;
- Ensure better risk management measure by guaranteeing a proper articulation between BPR and REACH ;
- Update the current restriction under Annex XVII entry 31 to ensure consistency among substances covered in entry 31 and BPR provisions for creosote and to focus on the provisions in the scope of REACH for legal clarity ;
- Foster an effective control of creosote and wood treated with it.

In the proposed restriction, the following terms will be used based on these definitions:

- **Use**: means any processing, formulation, consumption, storage, keeping, treatment, filling into containers, transfer from one container to another, mixing, production of an article or any other utilization (Article 3(24) of REACH Regulation);
- **Primary use**: use of wood treated with creosote or creosote-based products when first placed on the market;
- **Reuse**: in the current case, reuse of wood treated with creosote or creosote-based products means any operation by which this treated wood is used again

[13] https://www.legifrance.gouv.fr/loda/id/JORFTEXT000037972018/

for the same purpose for which it was primarily conceived (i.e primary use) (article 3-13 of Directive 2008/98/EC);

- **Secondary use**: use of wood treated with creosote or creosote-based products for different uses than their primary use when coming to their end of life (e.g. collection and use of treated wood as vegetable garden fences by private individuals);
- **Placing on the market**[14]: "Article 3(12) of REACH defines "placing on the market as supplying or making available, whether in return for payment or free of charge, to a third party. Import is deemed to be placing on the market. Placing on the market for the first time limits the scope of the restriction to the first natural or legal person who supplies or makes available substances, mixtures or articles on the market in the EU. The first placing on the market in the EU will either be by the manufacturer or the importer of the substance, mixture or article concerned" in the conditions and derogations defined by the BPR;
- **Non-tolerable risks** according to BPR is considered equivalent to the demonstration of **unacceptable risks** in the meaning of art 68 of REACH.
- **Second-hand market:** Creosote-treated wood placed on the market to be reused or proceeded for secondary-use after primary use.

As this restriction proposal aims at ensuring proper articulation between BPR and REACH, and considering that the first placing on the market of creosote-treated wood is assessed under BPR, all hazard, risk assessment data and conclusion will be directly referenced from the Renewal Assessment Report (RAR, 2021)[15] of creosote developed under BPR and reflected in BPC Opinion of 4 December 2020. No refinement or recalculation for risk assessment for REACH adaptation has been further developed. Moreover, the BPC opinion will set boundaries for this restriction proposal regarding the type of creosote treated-wood uses authorised under BPR and so, which articles are covered by the proposal. The present analysis has therefore been conducted based on information collected under BPR consultations for creosote approval renewal, consultations of Member State authorities and national railways and telecommunications managers. Moreover, audition of national railways managers was also performed. The collected information were used for estimating reuse that are technically possible and for which socio-econonmic data were available. If, during ongoing discussion and final approval of creosote renewal under BPR, other uses should be allowed, these uses would be covered by the restriction proposed.

[14] https://echa.europa.eu/support/qas-support/browse/-/qa/70Qx/view/scope/reach/importofsubstancesintotheEU

[15] https://echa.europa.eu/documents/10162/c41486a3-5e18-ab95-f74b-49d2611d4aa2

1.2. Hazard, exposure / emissions and risk

1.2.1. Identity of the substance(s), and physical and chemical properties

1.2.1.1. Creosote

Creosote (EC No 232-287-5; CAS No 8001-58-9) is a brownish-black oily liquid and is a distillation product of coal tars which themselves are by-products of the high-temperature destructive distillation of bituminous coal to form coke. Creosote is the intermediate cut, ranging from 200 to 355 ºC.

Creosote is a complex UVCB substance of hundreds of constituents, including bi- and polycyclic aromatic hydrocarbons (PAH), phenols as well as heterocyclic, oxygen-, sulphur- and nitrogen-containing substances. On average 35-43% of creosote constituents remains unidentified. The chemical composition is influenced by the origin of coal and also by the nature of the distillation process, and as a result, the composition of different batches may vary to a great extent.

It is not registered under the REACH Regulation No 1907/2006. European creosote must comply with EN 13991:2003. EN 13991 defines three types of creosote depending on the composition of this substance, type A, B and C creosotes. Regardless of the type of creosote, the substance is composed of more than 80% polycyclic aromatic hydrocarbons (PAHs), but also contains phenols and sulfuric, oxygenated heterocyclic compounds and nitrogenated compounds. Only “Grade B or Grade C creosote as specified in European Standard EN 13991:2003” are approved as biocidal substances as mentioned in Directive 2011/71/EU.

European creosotes must comply with EN 13991 which provides the following recommandations:

Table 3: Physico-chemical specification for authorised creosotes substance according to European Standard

Normative parameters according to EN 13991:2003	**Unit**	**Creosote Grade B (EN 13991)**	**Creosote Grade C (EN 13991)**
Density (20°C) ((BS 144-annex)	g/mL	1.02-1.15	1.03-1.17
Water content (ISO 760)	%	max. 1	max. 1
Crystallization temperature (EN 13991)	°C	max. 23	max. 50
Water- extractable phenols (EN 1014-4)	%	max. 3	max. 3
Matter insoluble in toluene (BS 144-annex G)	%	max. 0.4	max. 0.4
Boiling range (EN 13991): • Distillate to 235 °C • Distillate to 300 °C • Distillate to 355 °C	 % % %	 max. 20 40-60 min. 70	 - max. 10 min. 65

Benzo[a]pyrene (EN 1014-3)	mg/kg	max. 50	max. 50
Flash point Pensky-Martens (EN 22719)	°C	min. 61	min. 61

Table 4: Physical and chemical properties of creosote

Property	Value	Reference
Physical state at 20 ºC and 101.3 KPa	Brown liquid with aromatic phenolic odour (purity not applicable)	EU RAR (2021)
Melting / freezing point	Crystallization temperature: 0°C and 30°C (grade B and grade C respectively)	EU RAR (2021)
Boiling point	Range: ≥ 210 ºC – 400 °C (grade B) ≥ 260-400°C (grade C)	EU RAR (2021)
Vapour pressure	Measurements in the range 164-255°C (Grade B) and 180-285°C (grade C). Extrapolated: 20 °C 0.4 Pa (Grade B) 0.3 Pa (Grade C) 25 °C 0.66 Pa (Grade B) 0.50 Pa (Grade C) 50 °C 4.88 Pa (Grade B) 3.41 (Grade C) 100 °C 120 Pa (Grade B) 72.6 Pa (Grade C)	EU RAR (2021)

Water solubility	For creosote expressed as TOC: At a loading of 100 mg creosote/l water: 2.25-8.11 mg/l (Grade B, Grade B-composite and Grade C) At a loading of 10 g creosote/l water: 191 mg/l (Grade B-composite) 30.3 mg/l (Grade B) 27.7 mg/l (Grade C) Range for single components (literature data for 18 PAHs): 0.26 µg/l (benzo[ghi]perylene) – 31.7 mg/l (naphthalene) Higher solubilities anticipated for the polar components (i.e. phenolics, N-, S- and O-heterocycles)	EU RAR (2021)
Partition coefficient octanol/water (log value)	Experimentally determined for US types creosote P1/13 and P2: 2.7 (o:w 8:1)-3.7 (o:w 1:1.25) o:w = octanol to water ratio	EU RAR (2021)
Dissociation constant	Not available	

1.2.1.2. Other substances covered in entry 31 of annex XVII of REACH

Table 5: Other substances covered in entry 31 of annex XVII of REACH

Index No	International Chemical Identification	EC No	CAS No
648-099-00-5	Creosote oil; wash oil	263-047-8	61789-28-
648-085-00-9);	Distillates (coal tar), naphthalene oils; naphthalene oil	283-484-8	84650-04-4
648-098-00-X	Creosote oil, acenaphthene fraction; wash oil	292-605-3	90640-84-9
648-045-00-0	Distillates (coal tar), upper; heavy anthracene oil	266-026-1	65996-91-0
648-079-00-6	Anthracene oil	292-602-7	90640-80-5
648-116-00-6	Tar acids, coal, crude; crude phenols	266-019-3	65996-85-2
/	Creosote, wood	232-419-1	8021-39-4
648-110-00-3	Low temperature tar oil, alkaline; extract residues (coal), low temperature coal tar alkaline	310-191-5	122384-78-5

1.2.2. Classification and labelling

1.2.2.1. Classification and labelling according to Regulation (EC) No 1272/2008 (CLP)

The current harmonised classification and labelling according to Regulation (EC) No 1272/2008 (CLP Regulation) is as presented in Table 6 below.

Table 6: Current harmonised classification of creosote and substances covered by entry 31 according to CLP

Index No	International Chemical Identification	EC No	CAS No	Classification		Labelling			Spec. Conc. Limits, M-factors	Notes
				Hazard Class and Category Code(s)	Hazard statement code(s)	Pictogram, Signal Word Code(s)	Hazard statement code(s)	Suppl. Hazard statement code(s)		
648-101-00-4	Creosote	232-287-5	8001-58-9	Carc 1B	H350	GHS08	H350	-	-	-
648-099-00-5	Creosote oil; wash oil	263-047-8	61789-28-	Carc 1B	H350	GHS08	H350	-	-	Note M
648-085-00-9);	Distillates (coal tar), naphthalene oils; naphthalene oil	283-484-8	84650-04-4	Carc 1B Muta 1B	H350 H340	GHS08	H350 H340	-	-	Note M Note J
648-098-00-X	Creosote oil, acenaphthene fraction; wash oil	292-605-3	90640-84-9	Carc 1B	H350	GHS08	H350	-	-	Note M
648-045-00-0	Distillates (coal tar), upper; heavy anthracene oil	266-026-1	65996-91-0	Carc 1B	H350	GHS08	H350	-	-	Note M
648-079-00-6	Anthracene oil	292-602-7	90640-80-5	Carc 1B	H350	GHS08	H350	-	-	Note M
648-116-00-6	Tar acids, coal, crude; crude phenols	266-019-3	65996-85-2	Carc 1B Muta 1B	H350 H340	GHS08	H350 H340	-	-	Note M Note J

648-110-00-3	Low temperature tar oil, alkaline; extract residues (coal), low temperature coal tar alkaline	310-191-5	122384-78-5	Carc 1B Muta 1B	H350 H340	GHS08	H350 H340	-	-	Note M Note J

There is no harmonised classification according to CLP for:

- Creosote, wood: CAS No 8021-39-4 EC No 232-419-1.

1.2.2.2. Self-classification

In the table below, the self-classification proposed for each of the substances covered by the entry 31 of the Annex XVII are presented:

Table 7: Self-classification of substances covered by entry 31 Annex XVII of REACH

Substance name	Notifications in C&L inventory	Classifications mentioned in at least one notification
Creosote	11	Carc 1B, H350 (note H), Repro 1B, H360Fd, Skin irrit 2 H315, Skin sens 1B, H317, Eye irrit 2, H319, Aquatic Acute 1, H400, Aquatic chronic 1, H410
Creosote, wood	1514	Acute Tox. 3, H301, Acute Tox. 4, H302, Acute Tox. 3, H311, Skin Corr. 1B, H314, Skin irrit 2 H315, Skin sens 1, H317, Eye Dam. 1, H318, Eye irrit 2, H319, Acute Tox. 3, H331, Acute Tox. 4, H332, Muta. 2, H341, Repr. 2, H361, STOT RE 2, H373 (Lung), Aquatic Chronic 2, H411, Aquatic Chronic 3, H412,
Creosote oil; wash oil	1	Carc. 2, H351, Skin irrit 2 H315, Eye irrit 2, H319, Aquatic Chronic 2, H411
Tar acids, coal, crude; crude phenols	2	Acute Tox. 3, H301, H311, H331, Acute Tox. 3, H311, Skin Corr. 1B, H314, Eye Dam. 1, H318, Acute Tox. 3, H331, Muta. 2, H341, STOT RE 2, H373, Aquatic Chronic 2, H411
Distillates (coal tar), naphthalene oils; naphthalene oil	29	Flam. Liq. 3, H226, Acute Tox. 4, H302, Skin Corr. 1B, H314, Skin sens 1, H317, Muta. 1B, H340, Muta. 2, H341, Carc 1B, H350, Aquatic Acute 1, H400, Aquatic chronic 1, H410, Aquatic Chronic 2, H411
Low temperature tar oil, alkaline; extract residues (coal), low temperature coal tar alkaline	/	/
Anthracene oil	/	/
Creosote oil, acenaphthene fraction; wash oil	176	Asp. Tox. 1, H304, Skin irrit 2 H315, Skin sens 1, H317, Muta. 2, H341, Carc 1B, H350, STOT RE 2, H373 (Lung), Aquatic Chronic 2, H411
Distillates (coal tar), upper; heavy anthracene oil	6	Asp. Tox. 1, H304, Skin irrit 2 H315, Skin sens 1, H317, Muta. 1B, H340, Carc 1B, H350, Repr. 2, H361, STOT RE 2, H373 (Lung), Aquatic Chronic 2, H411

1.2.3. Classification and labelling proposed by the BPC Opinion for creosote

The proposed classification and labelling according to CLP in the BPC opinion on creosote is:

Table 8: Proposed classification and labelling in BPC opinion on the renewal of authorisation of creosote

Proposed classification according to the CLP Regulation	
Hazard Class and Category Codes	Carc 1B, H350 Repr 1B, H360F Repr 2, H361d Skin irrit 2, H315 Skin sens 1, H317 Eye irrit 2, H319 Aquatic Acute 1, H400 Aquatic chronic 1, H410
Labelling	
Pictogram codes	GHS07 GHS08 GHS09
Signal Word	Danger
Hazard Statement Codes	H350: May cause cancer H360Fd: May damage fertility. Suspected of damaging the unborn child H315: Causes skin irritation H317: May cause an allergic skin reaction H319: Causes serious eye irritation. H410: Very toxic to aquatic life with long lasting effects
Specific Concentration limits, M-Factors	M=10

1.2.4. Manufacture and uses

1.2.4.1. Creosote

The substance is not registered under REACH.

Creosote is used as wood preservative and is applied to wood after vacuum-pressure impregnation or direct application by surface treatment or brushing. The preservative properties of creosote arise through its biocidal activity against wood rotting fungi, invertebrates feeding on wood or marine borers. To our knowledge, there is currently 42 impregnation plants in the EEA. Creosote can be sold to professional only in packaging of a capacity equal to or greater than 20 litres.

The focus of this restriction dossier is on the reuse and secondary-use of wood treated with creosote and creosote-based products and detailed information on manufacture, import and export of creosote and on uses of creosote-based treated wood are provided in Annex B.

From a practical perspective, wood treated with creosote can be reused if the condition of the material allows it. Such reuse practices can be implemented by the original user or by another user (sale or donation of the used timber). **Such reuse practices are mostly observed for railway sleepers** (MSCA consultation and hearings; CGEDD, 2017)[16]. It appears that the reuse of timber treated with creosote primarily used for transmission poles, fencing, as tree support poles and in harbors and waterways is very limited due to the poor condition of the material at the end of service-life (even if marginally possible for transmission poles). Associated reused volumes seem to be of limited extent but no quantitative data is available. Consequently, combined with the lack of quantitative data and the marginal "reuse" extent of transmission poles, only the reuse of railway sleepers is further documented in the remainder of this restriction dossier.

Secondary uses of creosote-treated wood have also been reported in the EEA (MSCA consultation and hearings; CGEDD, 2017). **These secondary uses seem to mainly involve timber primarily used as railway sleepers and transmission poles**. **Such secondary uses are reported to be implemented both by private individuals and professionals for the following uses:**

- Landscaping, Agricultural fencing,
- Support poles – agriculture,
- Garden fencing,
- Cladding and construction,
- Environmental engineering.

Some secondary uses prohibited under REACH Annex XVII, entry 31 (§ 3) still remain at present, although the decline in these practices following the entry into force of this current restriction has been observed. Treated wood being subject to such secondary uses can be sold or donated. However information on the quantity of second-hand creosoted railway sleepers traded as well as on supply networks is fragmented at best (see Annex B.2.3 for details).

Wooden railway sleepers treated with creosote can be reused if the condition of the material allows it. Reuse practices can be implemented by the original user – i.e., national rail infrastructure managers – or by another user having benefited from the sale or donation of the used sleepers – private sidings or tourist railroads.

Qualitative and quantitative data on the implementation of reuse practices for railway sleepers available is very scarce. Therefore MSCA in the EEA and a selection of national rail infrastructure managers (NRIMs) have been asked to report the situation on that matter in their country. **The implementation of reuse practices has been directly reported for France, and Finland** and marginal reuse volumes were reported for Norway and the Czech Republic, **as well as the absence of reuse on the part of the German network managed by the Deustche Bahn** (87% of the German network) **and in the Spanish network.** The reuse of wooden railway sleepers is implemented by the NRIMs mainly in low traffic lines as well as in sidings and service facility tracks as part of a circular economy approach. Reuse allows to reduce acquisition costs and waste management costs for NIRMs. The sale of used

[16] CGEDD: Report n°010963-01: Impact assessment on the ban of use of creosote in France, May 2017, https://cgedd.documentation.developpement-durable.gouv.fr/documents/Affaires-0009737/010963-01_rapport-publie.pdf

sleepers to private networks (private sidings and tourist railroads) has been reported in Finland. Such practices also existed in France before the enforcement of the Decree of December 18, 2018 relating to the restriction of use and marketing of certain treated wood came into force. When allowed, the reuse of used sleepers enables these private network managers to maintain their network at a lower cost.

Information on annual reuse volumes was made available for France and Finland only (each year 10,000 and 20,000 to 30,000 sleepers are reused respectively). Due to the lack of available data and the short preparation time for this dossier, **the Dossier Submitter has performed an estimation of the reuse volumes of creosoted railway sleepers for reuse by the original user and other users in the Italian railway network[17].** These volumes are mainly estimated through an extrapolation from French data. **Approximately 62,000 to 72,000 creosoted sleepers are reused in the EEA each year. The NRIMs surveyed during the preparation of this report consider that these reuse volumes will remain constant over the next few decades.**

In the remainder of this restriction dossier, **the Dossier Submitter therefore considered that the reuse of creosoted sleepers takes place in France, Finland and Italy.** Such an approach may lead to an overestimation of reuse volumes but this should avoid underestimating the impact of the proposed restriction.

1.2.4.2. Other substances covered in entry 31 of Annex XVII of REACH

These substances are not authorised for a biocidal use of treated wood in Europe under Directive 528/2012 and their uses are therefore not further developed in this restriction dossier. They are only briefly summarised here for information as they have been used in the past to treat wood and that treated-wood with such substances exist on the market and are potentially subject to reuse.

Distillates (coal tar), naphthalene oils

Based on information available from the registration dossier (ECHA dissemination site), this substance is registered under the REACH Regulation and is manufactured in and / or imported to the EEA, for intermediate use only. This substance is used in articles, in formulation or re-packing, at industrial sites and in manufacturing, as a laboratory chemical. This substance is used in closed processes with no likelihood of exposure, closed, continuous processes with occasional controlled exposure, closed batch processing in synthesis or formulation, transfer of chemicals at dedicated facilities and laboratory work. Release to the environment of this substance can occur from industrial use as an intermediate step in further manufacturing of another substance (use of intermediates) and manufacturing of the substance.

Distillates (coal tar), upper

Based on information available from the registration dossier (ECHA dissemination site), this substance is registered under the REACH Regulation and is manufactured in and / or imported to the EEA, for intermediate use only. This substance is used in manufacturing in closed

[17] As mentioned in the previous section, according to SNCF Réseau the implementation of reuse practices is possible and relevant only in large and dense railway networks that is France, Germany, Italy and Spain. However, the German and Spanish MSCA reported that no reuse of used creosoted sleepers takes place in the national network.

processes with no likelihood of exposure, closed, continuous processes with occasional controlled exposure, transfer of chemicals at dedicated facilities and laboratory work. Release to the environment can occur from industrial use in manufacturing of the substance.

Creosote oil, acenaphthene fraction

Based on information available from the registration dossier (ECHA dissemination site), this substance is registered under the REACH Regulation and is manufactured in and / or imported to the EEA, at ≥ 100 000 to < 1 000 000 tonnes per annum. This substance is used in articles, by professional workers (widespread uses), in formulation or re-packing, at industrial sites and in manufacturing, as an intermediate.

This substance is used in the low energy manipulation of substances bound in materials or articles, potentially closed industrial processing with minerals/metals at elevated temperature (e.g. smelters, furnaces, refineries, coke ovens) and production of mixtures or articles by tabletting, compression, extrusion or pelletisation. It is also used in the transfer of chemicals, roller or brushing applications, closed batch processing in synthesis or formulation, closed, continuous processes with occasional controlled exposure, potentially closed industrial processing with minerals/metals at elevated temperature (e.g. smelters, furnaces, refineries, coke ovens) and laboratory work, treatment of articles by dipping and pouring, closed batch processing in synthesis or formulation, mixing in open batch processes and batch processing in synthesis or formulation with opportunity for exposure. This substance is also used for the manufacture of mineral products (e.g. plasters, cement), metals and chemicals. This substance is used in coating products and adhesives and sealants, formulation of mixtures and/or re-packaging.

Release to the environment of this substance can occur from industrial use in the production of articles, formulation of mixtures and formulation in materials. Other release to the environment of this substance is likely to occur from outdoor use in long-life materials with low release rate (e.g. metal, wooden and plastic construction and building materials) and outdoor use resulting in inclusion into or onto a materials (e.g. binding agent in paints and coatings or adhesives).

Creosote oil

Based on information available from the registration dossier (ECHA dissemination site), this substance is registered under the REACH Regulation and is manufactured in and/or imported to the EEA, for intermediate use only.

This substance is used in formulation or re-packing, at industrial sites and in manufacturing of chemical, in closed processes with no likelihood of exposure, closed, continuous processes with occasional controlled exposure, closed batch processing in synthesis or formulation, transfer of chemicals at dedicated facilities, transfer of substance into small containers and laboratory work.

Release to the environment of this substance can occur from industrial use in formulation of mixtures.

Tar acids, coal, crude

Based on information available from the registration dossier (ECHA dissemination site), this substance is registered under the REACH Regulation and is manufactured in and / or imported to the EEA, for intermediate use only.

This substance is used in formulation or re-packing, at industrial sites in closed processes with no likelihood of exposure, closed, continuous processes with occasional controlled exposure, closed batch processing in synthesis or formulation, transfer of chemicals at dedicated facilities and laboratory work.and in manufacturing of another substance as intermediate.

Release to the environment of this substance can occur from industrial use as an intermediate step in further manufacturing of another substance (use of intermediates).

9H-carbazole; anthracene; phenanthrene

Based on information available from the registration dossier (ECHA dissemination site), this substance is registered under the REACH Regulation and is manufactured in and / or imported to the EEA, at ≥ 10 000 to < 100 000 tonnes per annum.

This substance is used in articles, by professional workers (widespread uses), in metals and fuels, in transfer of chemicals, closed batch processing in synthesis or formulation, mixing in open batch processes, roller or brushing applications, batch processing in synthesis or formulation with opportunity for exposure and treatment of articles by dipping and pouring, in formulation or re-packing, in the low energy manipulation of substances bound in materials or articles, in inks and toners, in the manufacture of textile, leather or fur, at industrial sites and in manufacturing.

Release to the environment of this substance is likely to occur from outdoor use in long-life materials with low release rate (e.g. metal, wooden and plastic construction and building materials) and indoor use in long-life materials with low release rate (e.g. flooring, furniture, toys, construction materials, curtains, foot-wear, leather products, paper and cardboard products, electronic equipment).

Creosote wood

The substance is not registered under REACH and no information is available on potential uses of substance.

Extract residues (coal), low temp. coal tar alk.

The substance is not registered under REACH and no information is available on potential uses of substance.

1.2.5. Environmental fate, hazard and risk assessment for environment and human health

Evaluation of the hazards of creosote as a biocidal substance, exposure and risks related to the primary use of creosote-treated wood is in the remit of BPC in the context of BPR. It is therefore considered, following the “One substance, one assessment principle” that a re-assessment of these aspects under REACh is not necessary and relevant.

The risks related to the reuse of creosote-treated wood are expected to be similar to the risks related to the primary use of creosote-treated wood assessed by BPC.

The information regarding environmental fate properties, hazard, exposure/emissions and risk for human health and the environment is therefore directly compiled from the opinion of the BPC (ECHA/BPC/274/2020) on the application for renewal of the approval of the active substance creosote, product type 8 under BPR. More detailed information are available **from the renewal assessment report (RAR)**[18].

1.2.5.1. Environmental fate properties

As concluded in BPC opinion, "*Creosote contains constituents fulfilling the PBT and/or vPvB criteria. Among these is anthracene, which was identified as a PBT during the initial approval and thus approximately 0.5-1.5% of the creosote constituents were considered to be PBT and 0% were vPvB at that time. Since then, the following constituents were considered to be PBT and vPvB*[19]*: chrysene, benz[a]anthracene, fluoranthene, phenanthrene and pyrene. With the new information on these five constituents approximately 7-15% of the creosote constituents are PBT and approximately 17-31% of the constituents are vPvB.* ***Therefore, creosote is considered to be a PBT/vPvB substance.*****"**

POP criteria

As concluded in BPC opinion, "*In the absence of confirmation that all major components of creosote rapidly degrade in air (so do not have the potential for long term transport) it may be considered to classify creosote as a substance potentially containing POP constituents.*"

1.2.5.2. Environmental hazard and risk assessment

Detailed assessment of hazard, exposure and risks calculation for the environment are provided in the RAR evaluated by BPC (RAR, 2021). Only relevant conclusions related to environmental risks for use of creosote-treated wood in the scope of this restriction are reminded here.

As concluded in BPC opinion, "*For PBT and vPvB substances, the quantitative risk assessment method currently available (PEC/PNEC comparison) does not provide sufficient confidence that the environmental compartments are sufficiently protected […]. Chemical substances with PBT/vPvB properties can give rise to toxic effects after a greater time and at a greater distance than chemicals without these properties. Therefore, there may be temporal and/or spatial scale protection goals that are not covered by the standard PEC/PNEC comparison […]. Consequently, the properties of the PBT and vPvB-substances lead to an increased uncertainty in the estimation of risk to the environment when applying standard quantitative risk assessment methodologies such as the PEC/PNEC comparison. The PEC values presented in the assessment report provide an estimation on the magnitude of exposure to each*

[18] https://echa.europa.eu/documents/10162/c41486a3-5e18-ab95-f74b-49d2611d4aa2

[19] These substances have been included in the Candidate List of substances of very high concern for authorisation in accordance with Article 59(10) of the REACH Regulation following their identification as PBT and vPvBs.

environmental compartment from the intended uses of creosote. Likewise, the PEC/PNEC values can be considered to provide an indicative level of risk for each use class.

For the renewal of approval of creosote an assessment of endocrine-disrupting properties is required according to the scientific criteria laid down in Regulation (EU) 2017/2100[20]. Information on several selected constituents of creosote was submitted. However, this information was considered insufficient to conclude on the endocrine-disrupting properties of creosote for non-target organisms.

The table below summarises the exposure scenarios assessed. The conclusion for each scenario assessed with a quantitative risk assessment method (PEC/PNEC comparison) is indicated as "acceptable" when PEC/PNEC is <1, and as "unacceptable" when the PEC/PNEC is >1 in order to describe the outcome of the assessment."

For the purpose of this restriction proposal, only outcomes related to the use of creosote-treated wood is reproduced in Table 9 below.

Table 9: Outcome of BPC quantitative environmental risk assessment for service-life of treated wood

Summary table: environment scenarios		
Scenario	**Description of scenario including environmental compartments**	**Conclusion**
Service life of treated wood*		
Noise barrier, in service only (UC 3)	Leaching to STP (and secondary via STP to surface water/sediment and application of sludge to soil) and direct emission to soil	$PEC/PNEC_{STP}$<1 acceptable (<0.001 at Time2* and <0.01 at Time1) **$PEC/PNEC_{soil}$>1 unacceptable** (2.71 at Time 2 and 0.078 at Time 1)
Bridge over Pond, in service only (UC 3)	Direct emission to surface water/sediment due to leaching	$PEC/PNEC_{water}$<1 acceptable (0.24 at Time 2 and 0.02 at Time 1) $PEC/PNEC_{sediment}$<1 acceptable (0.06 at Time 2 and 0.006 at Time 1) acceptable
Jetty in the lake, in service only (UC 4b)		**$PEC/PNEC_{water}$>1 unacceptable** (6.51 at Time 2 and 0.46 at Time 1) $PEC/PNEC_{sediment}$ <1 (0.009 at Time 2 and 0.10 at Time 1)
Sheet pilling in waterway, in service only (UC 4b)		**$PEC/PNEC_{water}$>1 unacceptable** (75.15 at Time 2 and 410.0 at Time 1) **$PEC/PNEC_{sediment}$>1 unacceptable** (11.48 at Time 2 and 62.64 at Time 1)

[20] https://eur-lex.europa.eu/eli/reg_del/2017/2100/oj

Harbour wharf, in service only (UC 5)		**PEC / PNEC$_{seawater}$ > 1 unacceptable** (7.50 at Time 2 and 41.05 at Time 1) **PEC / PNEC$_{seased}$ > 1 unacceptable** (2.30 at Time 2 and 12.55 at Time 1)
House, in service only (UC 3)	Direct emission to soil and groundwater	**PEC / PNEC$_{soil}$ > 1 unacceptable** (1.05 at Time 2 and 0.20 at Time 1)
Transmission Pole, in service only (UC 4a)		**PEC / PNEC$_{soil}$ > 1 unacceptable** (20.36 at Time 2 and 3.11 at Time 1) Qualitative assessment of exposure to groundwater does not raise significant concern.
Vineyard, in service only (UC 4a)		**PEC / PNEC$_{soil}$ > 1 unacceptable** (6.43 at Time 2 and 0.98 at Time 1) Qualitative assessment of exposure to groundwater does not raise significant concern.
Railway sleepers, in service only (UC 3)	Emission to groundwater	PEC$_{groundwater}$ < trigger value of 0.1 µg/L acceptable

In the emission estimation, Time 1 presents 30 d and Time 2 presents 20 years service life. PEC/PNEC ratios higher than one are presented in bold.
Details on uses classes after treatment of wood with creosote-based product are provided in Annex B table B-2.

It is assumed that risks from reuse of treated-wood that are in the scope of the restriction dossier are similar to freshly treated-wood. Indeed, as detailed in the RAR document, even if for some uses, risk decrease along time due to several physico-chemical and biological process (leaching, lixiviation, biodegradation, volatilisation), for several uses, risk to the environment calculated by PEC/PNEC ratio along time increases for terrestrial compartment, sediments and even surface water in harbour for several uses (RAR, 2021). Leaching of creosote from treated wood occurs along time and depends on the environment in which the treated-wood are installed. Despite the phenomenon, the RAR provides indication of unacceptable risks still occurring after 20 years of service life for several uses (at the exception of bridge over pond and railway sleepers), indicating that this situation needs to be tackled.

The European Standard EN 335 dedicated to durability of wood and wood-based products defines five use classes (UC) that represent different service situations to which wood and wood-based products can be exposed:

- UC 3 is for end uses where wood is used outdoors not in contact with the ground;
- UC 4 is for end uses where wood is in contact with or very close to the ground and frequently wet;
- UC 5 is for outdoor uses with regular or constant contact with the ground or water.

For railway sleepers, the assessment of groundwater contamination was performed in the RAR by applying classical parameters to the exposure scenario (FOCUS PEARL) and a worst case scenario parameters corresponding to UC5 retention time (railway sleepers are considered as UC3). **The estimation of release where always below the triggering value of 0.1µg/L permissive value concentration laid down by the Directive**

2006/118/EC on the protection of groundwater against pollution and deterioration (RAR, 2021).
For bridge over pond in service use in regards to direct emission to surface water/sediment due to leaching, exposure scenario provide an acceptable outcome (PEC/PNEC below 1 for the two time service).

Since creosote is an UVCB substance containing PBT and vPvB constituents, these properties can give rise to toxic effects after a greater time and at a greater distance than chemicals without these properties. Consequently, the properties of the PBT and vPvB-substances lead to an increased uncertainty in the estimation of risk to the environment when applying standard quantitative risk assessment methodologies such as the PEC/PNEC comparison.

As concluded by the BPC Opinion, "*With respect to the environmental risk assessment**, the only uses which did not result in unacceptable risks based on the quantitative risk assessment were the use for railway sleepers and the use for bridge over pond (UC 3)**. […]*

However, since creosote is an UVCB substance containing PBT and vPvB constituents, the quantitative risk assessment method currently available does not provide enough confidence that the environmental compartments are sufficiently protected and there is a remaining uncertainty in the estimation of risks to the environment. ***Therefore, it is not demonstrated that there are no unacceptable effects to the environment*****."**

The estimations performed with the available data and, considering the uncertainties, the DS considered that acceptable risks demonstrated for primary use will remain acceptable for their reuse (e.g. railway sleepers).

1.2.5.3. Human health hazard and risk assessment

Detailed assessment of hazard, exposure and risks calculations for human health are provided in the RAR evaluated by BPC. Only relevant conclusions related to human risks for use of creosote-treated wood in the scope of this restriction are reminded here.

As concluded in BPC opinion, "*Creosote is considered a non-threshold carcinogen. The genotoxic (non-threshold) effect could not be excluded based on the submitted studies. For non-threshold effects the underlying assumption is that a no-observed-effect-level cannot be established. Instead, a Derived Minimal Effect Level (DMEL) is established which represents a level of exposure that could lead to one increased cancer incidence per 100.000 workers or per 1.000.000 of general population, ie cancer risk levels of 10^{-5} and 10^{-6}, respectively. These cancer risk levels are considered to correspond to low risks and could be seen as indicative tolerable risks. For creosote, a DMEL value for workers has been derived, whereas no DMEL for the general public was set as the conclusion – i.e. "non-tolerable" – for the relevant scenarios would not change. The exposure assessment of creosote is based on monitoring data from operators and workers in impregnation plants. The resulting margins of exposure (MoE) can subsequently be used in judging the significance of any residual exposure after introducing strict risk management measures and for providing information in further targeting measures. A MoE above 25000 is considered to be of low concern for workers for a non threshold carcinogen.*

For the renewal of approval of creosote an assessment of endocrine-disrupting properties is required according to the scientific criteria laid down in Regulation (EU) 2017/2100. Information on several selected constituents of creosote was submitted. However, this

information was considered insufficient to conclude on the endocrine-disrupting properties of creosote for humans."

For the purpose of this restriction proposal, only outcomes related to the use of creosote-treated wood is reproduced in Table 10 below.

Table 10: Outcome of BPC quantitative human health risk assessment for service-life of treated wood

Summary table: human health scenarios			
Scenario	**Primary or secondary exposure and description of scenario**	**Exposed group**	**MoE***
Secondary exposure for pressure impregnation for UC 3, 4 and 5			
UC 3 and 4			
Post application of treated poles or equestrian fences	Secondary dermal exposure, adult, children 6-12y, children2-6y,and toddler – contact treated poles or equestrian fences	General public	**1750 non-tolerable** **1332 non-tolerable** **1124 non-tolerable** **1035 non-tolerable** No RMMs are available to reduce the exposure.
UC 4			

Down-stream users (electricity pole installers)	Secondary exposure. Furnishing of poles	Professionals	40384 tolerable RMMs reducing the exposure: • Stringent adherence to the protective measures that are already in place. • The personal hygiene shall be strict, and washing with suitable cleaning solutions shall be performed as soon as possible after each work task where there is a risk of exposure. • The PPE should be changed frequently. • Respiratory protection, such as a full face mask with particle filter P2 or preferably P3 in combination with gas filter A (brown) should be worn at critical work tasks when there is a risk of inhalation exposure (e.g. if any drilling, mounting or fitting during installation is needed) • Chemical resistant (coated) coveralls, or equivalent, should be worn over the regular work clothes at critical work tasks when there is a risk of exposure, and a thinner pair of (cotton) gloves should be worn under the chemical resistant gloves. • Sky lifts (aerial access platforms) shall be used if feasible/whenever possible. • Whenever possible, mechanical or automated processes should be used to avoid manual handling of treated timber (including down-stream work, for example during work with poles in service). • Where there is a potential contact with Creosote or Creosoted wood, long sleeves shirts and long pants must be worn.
Down-stream users (electricity pole installers)	Secondary exposure. Installation of conductors	Professionals	95454 tolerable RMMs reducing the exposure: • Stringent adherence to the protective measures that are already in place. • The personal hygiene shall be strict, and washing with suitable cleaning solutions shall be performed as soon as possible after each work task where there is a risk of exposure. • The PPE should be changed frequently. • Respiratory protection, such as a full face mask with particle filter P2 or preferably P3 in combination with gas filter A (brown) should be worn at critical work tasks when there is a risk of inhalation exposure (e.g. if any drilling, mounting or fitting during installation is needed). • Chemical resistant (coated) coveralls, or equivalent, should be worn over the regular work clothes at critical work tasks when there is a risk of exposure, and a thinner pair of (cotton) gloves should be worn under the chemical resistant gloves. • Sky lifts (aerial access platforms) shall be used if feasible/whenever possible. • Whenever possible, mechanical or automated processes should be used to avoid manual handling of treated timber (including down-stream work, for example during work with poles in service). • Where there is a potential contact with Creosote or Creosoted wood, long sleeves shirts and long pants must be worn.

Down-stream users (pole installers)	Secondary exposure. Installation of a separator	Professionals	**744 non-tolerable** RMMs reducing the exposure: • Stringent adherence to the protective measures that are already in place. • The personal hygiene shall be strict, and washing with suitable cleaning solutions shall be performed as soon as possible after each work task where there is a risk of exposure. • The PPE should be changed frequently. • Respiratory protection, such as a full face mask with particle filter P2 or preferably P3 in combination with gas filter A (brown) should be worn at critical work tasks when there is a risk of inhalation exposure (e.g. if any drilling, mounting or fitting during installation is needed). • Chemical resistant (coated) coveralls, or equivalent, should be worn over the regular work clothes at critical work tasks when there is a risk of exposure, and a thinner pair of (cotton) gloves should be worn under the chemical resistant gloves. • Sky lifts (aerial access platforms) shall be used if feasible/whenever possible. • Whenever possible, mechanical or automated processes should be used to avoid manual handling of treated timber (including down-stream work, for example during work with poles in service). • Where there is a potential contact with Creosote or Creosoted wood, long sleeves shirts and long pants must be worn.

* A margin of exposure value below 25000 is presented in bold. It could not be assessed if the RMMs indicated in the summary table for those scenarios for which the conclusion is "non-tolerable" would lead to an amendment of this conclusion (creosote is only for uses by professionals where the frequency of changing PPE is covered by Health and Safety at Work regulations;among the listed RMMs the non-quantifiable ones are also given to be applied in order to minimise risk as much as possible).

As concluded in BPC opinion, "*For professionals, **there are sufficient MOEs only for the downstream users including pole installers for the tasks of installation of conductors and furnishing of poles**. However, it must be highlighted that creosote is a non-threshold carcinogen and therefore professional uses require extra protective measures to minimize contact with creosote during work tasks. For plant workers the dermal and inhalation routes of exposure have been identified. For downstream users, mainly dermal route of exposure is foreseen, however, inhalation exposure might occur (e.g. if any drilling).*

With respect to downstream users only data for pole installer were available to perform an assessment. For other uses – for example installation of railway sleepers – no data were available to conclude if the risk can be considered as tolerable or non-tolerable.

For general public, secondary exposure via dermal and oral route can occur:

- *dermal exposure can occur by touching treated equestrian fences and poles. **As the result of the assessment, a non-tolerable risk for all population groups (adults, children, toddlers) was identified**.*
- *oral exposure can occur via residues in plant- and animal-derived food as fruits and other plant crops can grow in the vicinity or in direct contact with creosoted poles and animals are supposed to have dermal contact with fences and eat grass in the vicinity of creosoted fences. The information referring to exposure to the residues in food as well as livestock exposure submitted by the applicant has been analysed. However it is evaluated as insufficient for consumer and animal risk assessment.*
  For calculating dermal and oral (by licking) exposure the applicant used leaching rate Time 1, whereas for calculating oral exposure (by grass-eaters) the applicant used leaching rate Time 2. As the worst-case scenario refers to newly impregnated wood, the leaching rate Time 1 is used by eCA PL to assess exposure to livestock. However, no data on the consumer exposure to meat or milk derived from livestock having contact with impregnated wood or contaminated grass has been provided by the applicant. The consumer risk assessment could not be finalized due to this data gap. Additionally, it is considered that any use of creosote - as a non-threshold carcinogen
- *that leads to food residues is considered unacceptable.*"

As detailed in the assessment of the risks for the environment, creosote is an UVCB substance containing PBT and vPvB constituents, these properties can give rise to toxic effects after a greater time and at a greater distance than chemicals without these properties in the environment but it may also signify that these toxic effects can arise for human all along service life of treated wood. This was reflected in the RAR document and in the BPC opinion, where all scenario of exposure of worker led to non-tolerable risk (Primary exposure for pressure impregnation for UC 3, 4 and 5 and Primary exposure for brushing for UC 3 and 4 for worker led to a non-tolerable MoE), at the exception of the two scenario detailed earlier in this section. Moreover, secondary exposure of the general public via the dermal route by contact with impregnated wood (e.g. fences) was assessed during the renewal of authorisation. For all population groups the exposure by dermal route results in unacceptable risks. Therefore, the risk for the general public is not tolerable.

As a classified non threshold carcinogen substance and highly persistant substance, it is assumed that risks from expositions associated with reuse covered by the scope of this restriction dossier are similar to the initial risks assessed under BPR and do not dissipate along time.

1.2.6. Overall conclusion on the risk for the uses in the scope of this restriction

The use of creosote as a biocide present risks to human health and to the environment at different stages:

- during the handling of treated wood, its transport, its installation, its removal by professionals who use wood;
- during the use of treated wood, due to diffusion in water, air or the soil of creosote;
- during the use of wood as second-hand product (e.g. sleepers used in garden or structure construction, …);
- as waste, when the user of treated wood must dispose of it according to WFD

As demonstrated in the previous sections, creosote treated-wood articles present risks to the environment and human health, in particular for professional workers and the general public, which are not adequately controlled.

Non-tolerable risks as evaluated according to BPR are considered equivalent to the demonstration of unacceptable risks in the meaning of art 68 of REACH.

Non-tolerable risk in all the scenarios for professional workers in the wood impregnation plants was identified.

Transmission poles (overhead electricity and telecommunication) impregnated by pressure method pose tolerable risks for installers for the tasks of installation of conductors and furnishing of poles only with RMM (PPE).

For agricultural fencing and equestrian fencing, the use poses non-tolerable dermal exposure risk for general public (child, toddler and adult). The assessment for consumer dietary exposure for the uses agricultural and equestrian fencing and tree support poles was inconclusive due to the lack of adequate data on animal exposure and residues in animal-derived food. However, it is considered that any use of creosote that leads to food residues is unacceptable. Acceptable risks to the environment were identified in service scenarios: bridge over pond as well as railway sleepers. For the other scenarios unacceptable risks to the environment were identified. It is demonstrated that for some scenarios, risks decrease along time due to loss or degradation of creosote but the opposite is also demonstrated for several uses, especially for terrestrial compartment, sediments and even surface water in harbour.

Due to its specific PBT, vPvB and non threshold carcinogen properties, these properties can give rise to toxic effects after a greater time and at a greater distance than chemicals without these properties. Despite all uses are judged leading to unacceptable risks when combining the outcomes of the human health and environmental risk assessment, some uses such as railways sleepers in service, bridge over pond in service, and downstream users including pole installers for the tasks of installation of conductors and furnishing of poles are judged tolerable.

By derogation set out in Article 5(2) of BPR (i.e.there is evidence that the active substance is essential to prevent or control a serious danger to human health, animal health or the environment and the fact that 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) some uses are currently authorised under BPR. Based on the available evidences, and although some data show that environmental risks might increase over time, it is assumed that the human and environmental risks from reuses, specifically covered by the scope of this restriction dossier as secondary-use and second-hand market of already treated articles will be ban under this proposal, are similar to the risks from initial uses assessed under BPR and that the reasons leading to authorising the primary uses of creosote treated-wood should apply to the reuse.

1.3. Justification for an EU wide restriction measure

BPR only covers the first placing on the market of creosote treated-wood articles. As detailed by the BPC opinion on creosote renewal assessment "*the approval of creosote in product type 8 should normally not be renewed*" due to non-tolerable risk for the human health and unacceptable risks for environmental health, "*unless one of the conditions for derogation in Article 5(2) is met*". These derogations have led and may lead in the future depending on the renewal decision, to the presence of hazardous articles in the EEA market which utilisation, trade, free transfer/donation and disposal need to be regulated after first uses. That is the aim of the existing Annex XVII entry 31 of REACH, which need to be modified for reasons explained in this dossier. In particular, creosote treated-wood placed to the market before 2002 are not covered by the Annex XVII entry 31 of REACH. To provide a better framework for managing the reuses, secondary-uses, second-hand market and disposal of these hazardous articles, the proposed restriction is considered necessary and justifies an EU wide measure.

Moreover, the proposed restriction will contribute to the objectives set out in the Water Framework Directive (2000/60/EC)[21], to submit proposals for control measures for the cessation or phasing-out of discharges, emissions and losses of the concerned substances to surface waters.

Based on the above reasons, a Union-wide action to address the risks associated with EU manufactured or imported articles containing creosote is needed. The justifications for an EU wide restriction measure are:

- To ensure a harmonised high level of protection of the environment and human health due to the fact that risks for either human health and/or environment are identified for all uses of creosote-treated woods. It also applies to reuse and these risks shall be controlled by limiting reuse to the conditions laid down during authorisation for primary use;
- To ban the trade of hazardous end-of-life articles;
- To ensure that REACH provisions do not loosen the principle of national authorisations allowed under BPR;
- To ensure better identification and higher elimination of hazardous waste according to the Waste Framework Directive (No 2008/98/EC);

[21] https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF

As demonstrated in the previous sections, creosote treated-wood articles present risks to the environment and human health, in particular for professional workers and the general public. Under specific circumstances and if one of the conditions for derogation in Article 5(2) is met, BPR will most probably grant specific conditions for primary use of creosote treated-wood. The objective of this restriction proposal is to ascertain that reuse is performed under the conditions laid down during approval of primary use.

To provide a better framework for managing the reuses, secondary uses, second-hand market and disposal of these hazardous articles, the proposed restriction is considered necessary and justifies an EU wide measure.

1.4. Baseline

The baseline, the "business as usual" scenario, is defined as the current and predicted future reuse and secondary uses of creosote-treated wood without the proposed restriction and is described as follows:

- The geographical boundaries for the assessment are the countries of EEA;
- Regarding the relevant legislative context :
    - BPR only covers first placing on the market for creosote treated-wood articles.
    - Renewal of several uses are discussed i.e., those currently authorized at national level (Table A-2);
    - At the end of service-life, treated wood can be reused if the condition of the material allows it. After first use of treated timber as biocidal treated article, timber treated with creosote can be subject to reuse or secondary use prior or after second-hand market, which falls under REACH regulation and are no longer subjected to BPR. REACH Annex XVII entry 31 restricts the reuse and secondary uses of wood treated with creosote after December 31, 2002;
    - End-of-life creosoted wood is also considered as a hazardous waste.

As shown in Annex A, **reuse and secondary use practices of creosote-treated wood are observed in the EEA**. Little quantitative data is available on the volumes of timber being subject to reuse or secondary use each year and these are extremely difficult to monitor. Indeed, the sales/handover networks are informal in nature (unofficial online classified ads, etc.) and very diffuse among EEA. **Only the volumes of reuse of used railway sleepers have been quantified** during the elaboration of this dossier. **It is estimated that approximately 62,000 to 72,000 sleepers are reused annually within three countries - Italy, Finland and France** - by national rail infrastructure managers (NRIM) in low-traffic lines and service track as well as in private railroads (tourist and heritage railways, industrial railroads). Information collected from the MSCA and NRIM consulted during the elaboration of this dossier indicates that **these reuse volumes are likely to remain constant over the next few decades.**

Reuse by the initial user and other users are assumed to cause the same risks for humans and the environment as placing creosote-treated wood on the market for the first time. Indeed, the hazardous substances composing creosote, namely Carc. 1B and PBT, vPvB substances led to unacceptable risks remaining for long period of time. The reuse by other users than the initial user causes additional risks in terms of traceability and proper disposal

of hazardous waste at the end of life, with a risk of secondary uses by individuals, increasing the number of people potentially exposed. Indeed, secondary uses by individuals that are prohibited by Entry 31 of Annex XVII to the REACh regulation are still observed (see the Manufacture and uses chapter for further information), especially through the uses of old treated wood, treated before December 2002, generating risks for human health and the environment. These secondary uses could only be described qualitatively (see also Annex B.2.3). The MSCAs consulted in the context of the preparation of this dossier have emphasized a significant decrease in secondary uses after the Entry 31 of Annex XVII to the REACh regulation. However such uses remain and formalized official networks exist (imports/exports networks in particular).

As a result of these above asumptions, it is assumed that environmental and human health impacts linked to creosote-treated wood being subject to reuse and secondary uses, will remain constant over time despite availability of alternative for creosote treated wood.

2. Impact assessment

2.1. Introduction

When preparing an Annex XV restriction dossier on creosote and creosote-treated wood articles, it is asked to the Dossier Submitters to provide a thorough assessment of the specific regulation context and restriction option(s) that appear more viable, so that RAC and particularly SEAC have all relevant information and analysis at hand in order to be able to define the most appropriate restriction option when elaborating their opinions, so as to inform and support the Commission's risk management decision.

All uses of creosote-treated wood are considered to cause an unacceptable risk when combining human health and environment as demonstrated under BPR. Reuse and secondary-use of creosote-treated wood is considered to cause the same risks as primary use at the EU level and is considered as a target of the restriction In particular, placing on the market of creosote-treated wood is already restricted in the REACH Annex XVII entry 31. However, REACH Annex XVII entry 31 does not cover creosote-treated wood impregnated before 31 December 2002 and this type of wood can be placed on the market for secondary-uses at the exception of uses listed under paragraph 3. This derogation lead to an unacceptable risk for the environment and the human health. To mitigate this risk the proposed restriction would allow to simplify the ongoing entry 31 by deleting what is the remit of BPR and remove derogationnal regime for wood treated before 31 December 2002 as these susbtances are not covered by BPR and therefore deemed unused.

This restriction proposal is elaborated in a particular context since it results from the application of the safeguard clause by the French State (Article 129 of REACH) which aimed at restricting the use and the placing on the market of certain wood treated with creosote and other creosote-related substances as an unacceptable risk was highlighted. To address this request, the Dossier Submitter evaluated several options and conducted an analysis of two restriction options for the use identified in this Annex XV restriction report (i.e. reuse and secondary uses). This Annex XV dossier therefore aims to propose a harmonization of the current entry 31 covering creosote and creosote-related substance with the French decree in line with the European legislations regulating these substances. For that purpose, the DS directly proposes and evaluates the impacts of the implementation of a restriction based on

the risk assessment performed by the BPC under BPR. Several risk management options (RMOs) for the regulation of the reuse and secondary use of wood treated with creosote have been identified and discussed below (see sections 2.2.2 and following). Each restriction option is presented. Risk reduction and socio-economics impacts were assessed based on the criteria used for evaluating the appropriateness of a REACH restriction: effectiveness (i.e. targeting, risk reduction and proportionality to the risk), practicality (e.g. implementability, availability of alternatives, cost, and affordability), enforceability and monitorability.

Where good quality and detailed information on cost elements was available (albeit with some uncertainties), the Dossier Submitter has undertaken a quantitative impact assessment of the restriction options proposed. In most cases, it was not possible to quantify the benefits of a restriction option (e.g. valuation of environmental impacts on prohibition of secondary-uses). Instead, a qualitative assessment of the benefits was made and supported with quantitative information where available. For both restriction option presented, the lack of information available to the Dossier Submitter, led to qualitative estimation of concerned volumes of treated wood and overall qualitative assesment. It is expected that the consultation on the Annex XV restriction report will give more information or validate some of the hypotheses that were used.

Therefore, the impact assessment of each restriction option is comprised of a mix of the available cost information together with a qualitative assessment of other impacts, particularly to identify where a restriction option would have a disproportionate impact from a societal and economic perspective.

2.2. Risk management options

Several options have been considered.

2.2.1. Identification as SVHC according to REACH Article 57 and subsequent authorisation

Hazardous chemicals of the present restriction proposal may be identified as SVHC, according to REACH article 57 and put on the candidate list. Once listed on the Annex XIV, the substances may not be used or placed on the market without authorisation. The prioritisation for inclusion in Annex XIV from the candidate list is driven by several criteria that are set by Article 58 of REACH and implemented by ECHA following a methodology that has been agreed by the Member States Committee (MSC) that includes consideration related to hazards and to exposure parameters.

The SVHC identification of creosote would not lead to a significant risk reduction. Indeed, the aim of this dossier is to limit the reuse of the treated articles. But, the use of articles is not in the scope of authorisation. Moreover, as specified in article 56(4b) of REACH, authorisation shall not apply to substances used in biocidal products within the scope of Directive 98/8/EC. For these reasons, SVHC identification has been disreagarded as a valuable risk management option.

2.2.2. Introduction of labelling requirements

Biocidal products have to be classified, packaged and labelled in accordance with the CLP Regulation (Article 17 of CLP) and to contain additional specific label elements for biocidal products as specified in article 69 of BPR (partly referring to article 22). Additionnal labelling

elements are required when considering biocidal product comprising, not exhaustively, trade name of the biocidal product, name and address of the authorisation holder and authorisation number, identity and concentration of every active substance; presence of nanomaterials, type of formulation, uses authorised, directions for use, frequency of application and dose rate, for each authorised use,…. Moreover, for treated article in the meaning of the BPR, when a biocidal effect is claimed for the treated article or when is it required by the active subtance approval conditions, Article 58(3) of BPR defines different label requirements comprising:

- A statement that the treated article incorporates BP;
- Where substantiated, the biocidal property attributed to the treated article;
- The name of all active substances contained in the product;
- The name of all nanomaterials contained in the product;
- Any relevant instructions for use, including any precautions to be taken because of the biocidal products with which a treated article was treated or which it incorporates.

In its opinion for renewing the approval of creosote as a biocidal active substance, the BPC indicated that, if the renewal is granted, it shall be subjected to several labelling conditions, specified for authorised products and as follows for treated articles:

- The person responsible for the placing on the market of an article treated with or incorporating the active substance creosote shall ensure that the label of that treated article provides the information listed in the second subparagraph of Article 58(3) of the Regulation (EU) No 528/2012;
- Creosote treated articles should be labelled with these conditions for storage.
- Cresote treated articles shall be labelled containing a statement that the marketing of second-hand creosote treated articles to the general public is not allowed for articles treated after 31 December 2002 (as laid down in entry number 31 in Annex XVII of REACH).

No other specific requirement was introduced in the BPC opinion in order to follow creosote-treated wood all along their service life, from their impregnation to their disposal as hazard waste. **The DS estimates that the introduction of a specific labelling allowing a permanent information of exposed population (professional and non professional) on the risks and ensuring a proper follow up is deemed necessary for proper risk mitigation and monitorability of CMR, PBT, vPvB treated articles**.

The following could assist with the monitoring of creosote-treated wood:

- the introduction under BPR by national authorities of a specific labelling for creosote-treated wood allowing a better follow up of the treated-articles all along their lifetime, EU-harmonised codes to enable tracking of articles. This labelling can be a physical one such as an engraving steel plate, a bar code, a QR code or can be a more technological one, such as a near field communication (NFC) or Radio Frequency Identification (RFID) chip.

2.2.3. Safeguard clause Article 129 of REACH

Several risk management options (RMOs) for the regulation of the reuse and secondary use of wood treated with creosote had been discussed ahead that are presented above (see sections 2.2.1 to 2.2.2). As none allowed a proper risk management, and while awaiting the decision on the active substance renewal of approval under regulation 528/2012, French

authorities have decided to use safeguard clause article 129 of REACH by adopting a national regulatory provision on 18th December 2018 which aimed at restricting the use and the placing on the market of certain wood treated with creosote and other creosote-related substances. This restriction file is elaborated in a particular context since it follows the application of the safeguard clause by France. This dossier therefore aims to propose a harmonization of the European legislation on the basis of the French decree and because risks are identified under BPR, even though the corresponding decisions have not been taken yet. Risks were deemed identical for the reuse and secondary use by primary user or after second-hand market of treated wood which led DS to focus on the possibility of a restriction.

2.3. REACH Restriction options according to REACH Article 68

Today, inconsistencies exist between BPR covering the first placing on the market of articles treated with creosote as a biocidal product and the life of already treated articles, once on the market, covered by REACh. These articles can be subject to reuse or secondary use, can be sold or donated. At the end of service life, articles treated with creosote have to be disposed as a hazardous waste in dedicated facilities.

As unacceptable risks are demonstrated for the uses within the remit of REACH, a restriction is applicable. The scope of the restriction has to be defined precisely, including the substance as well as the definitions of the article targeted. This requirement is important to ensure the effectiveness, the enforceability and the monitorability of the restriction but also its consistency with other existing pieces of legislations that may cover the same or close field.

2.3.1. Description of options

Two different restriction options (RO) have been considered:

- RO 1: This option aims at restricting all reuses and secondary-uses of creosote-treated wood authorised under BPR and already placed on the market.
- RO2: This option would only allow the reuse of creosote-treated wood authorised under BPR solely for the same use (as primary use) under similar condition and by the same original user and would ban all secondary uses.

2.3.2. Qualitative assesment of options

A qualitative assessment of both options have been performed.

- For RO 1:
    - This scenario will ban all secondary-use of creosote-treated wood;
    - This scenario would not only ban reuse of wood treated with creosote by the original user but also totally ban trade or free transfer of already treated wood from the original user to professional and non-professionnal users for reuse (e.g. railway sleepers used in touristic railway line, gardening, cladding construction, …);
    - It would ensure the proper and total elimination of treated articles under the WFD as creosote-treated wood are hazardous wastes;

- It may lead to an over restriction of already treated wood, at the opposite of principles set out in the Waste Framework Directive and the new Circular Economy Action Plan[22], one of the building block of the European Green Deal from European Commission. Indeed, the Waste Framework Directive in its Article 4 sets hierarchy for waste that shall apply as a priority order in waste prevention and management legislation and policy:
  - (a) prevention;
  - (b) preparing for reuse;
  - (c) recycling;
  - (d) other recovery, e.g. energy recovery; and
  - (e) disposal.

  In its Resolution of 24 February 1997[23] on a Community strategy for waste management, the Council confirmed that waste prevention should be the first priority of waste management, and that reuse and material recycling should be preferred to energy recovery from waste, where and insofar as they are the best ecological options.

- For RO2:
  - This scenario will ban all secondary-use of creosote-treated wood;
  - Compared to RO1, RO2 would allow the reuse of creosote-treated wood in conditions strictly similar to the primary use;
  - It would ensure the proper and total elimination of treated articles under the WFD as creosote-treated wood are hazardous wastes;
  - It will be more in line with the recommendation set out in the WFD in regard to the hierarchy of waste. It will also ensure the respect of the Green Deal philosophy developed by the Commission in which lesser waste has to be produced and the maximum exploitation of assets needs to be reached in the principle of circular economy, when a good normally considered as a waste can be reuse several time if possible before its proper elimination;
  - As creosote is classified as Carc cat. 1B and contains PBT, vPvB substances, reuse can induce the same risks for human health and the environment as those demonstrated by the BPC for the use of creosote and creosote-treated wood. It would not impact the risk unless reuse prohibition leads to use other articles less hazardous than creosote-treated wood;
  - Reuse will allow to limit and/or avoid the amount of creosote used for new treatments to be put on the market in the remit of BPR authorisation (as long as the use is not banned within BPR);

[22] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN

[23] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ%3AC%3A1997%3A076%3ATOC

- It would however allow proper risk mitigation as reuse of creosote treated-wood, exactly as the first placing on the market, would be authorised for professionals under strict conditions as defined under BPR;

These assessments are underpinned by information on uses, releases, availability of alternatives and socio-economic impacts and on the highly probable reapproval of creosote as a biocidal active substance under BPR.

2.3.3. Human health and environmental impacts of the proposed restriction

The DS was not able to quantify the environmental and human health benefits of the proposed restriction. The proposed restriction covers the management of articles treated with biocidal products authorised under BPR and already placed on the market in the meaning of REACH. As demonstrated by the RAR and BPC opinion on creosote, risks were observed for human health and for the environment through the utilisation of the substance and availability of treated articles with creosote, an UVCB substance classified as carcinogen cat 1B and containing PBT, vPvB constituents. By solely managing already treated articles, the proposed restriction options will not lead to substantial decrease in the identified risks for the corresponding (re)uses.

Indeed, exposure of professionnal will remain and occur during all uses of the substances and treated articles (from handling the substance in authorised products to handling treated wood for stockage, transport, installation on site and maintenance operations) and exposure of the environment will occur through services life of creosote-treated wood. The risk reduction will mainly arise from the prohibition of secondary uses for creosote-treated wood by decreasing exposure of professionnal and potentially less trained professionnal (non impregnators professionnal) operating in the removal of old treated-wood. It would also allow to avoid at a maximum extent the exposition of general population. When considering the option RO1, which prohibits all reuse and secondary uses of treated wood, the exposition linked to products containing the substance and uses under BPR will remain and potentially even increase if freshly creosote-treated wood is the preferred alternative to old creosote-treated wood (in the case a renewal of authorisation is granted for creosote as a biocidal product). Both RO would not impact the risk unless reuse prohibition leads to use other substances, treated articles or articles less hazardous than creosote-treated wood.

On the other hand, as the restriction aims at clarifying and restricting the conditions under which reuse will happen, it should, in practice reduce the risks regarding human health. Both options propose to ban all secondary uses of creosote treated-wood contrarily to what is possible today with the current entry 31: as a consequence, human health for the general public and the environment would be better protected.

The proposed restriction would increase protection of human health by sharply and even totally decreasing exposure of general public, decreasing exposure of professionnals and decreasing exposure of the environment.

Depending on the decisions to be taken within BPR remit, the prohibition of reuse of wood treated with creosote already put in the market in RO1 could promote the use of new creosote treated-wood potentially leading to increase exposure of professional and the environment.

While favoring the reuse, RO2 would also have a positive impact on the environment as it will limit the amount of creosote (primary use of creosote-treated wood) in the remit of BPR authorisation. In addition, as only sleepers of in good conditions would be reused and those of bad qualities would normally be disposed under preconisation of WFD and that the proposed restriction aimed at reinforcing the information regarding the handling of these treated articles at the end of their lifetime and being handle as an hazardous waste, risks to human health would decrease.

Therefore, it is difficult to rank RO1 and RO2 in terms of direct risk assesment and reduction, all the more as the final decision within the BPR framework are not taken. At this stage, RO2 appears more appropriate regarding the global environmental impact assesment. Moreover, both RO1 and RO2 environmental and human health impact assesments are positive compared to the baseline.

2.3.4. Overview of the alternatives necessary for the 2 options

This part is not developed in this dossier. Indeed, national derogations for specific uses of creosote-treated wood could be given under BPR, while considering the issue of alternatives that apply to reuses under similar conditions and by the same original user.

Alternatives to creosote and creosote-treated wood exists, are already available on the market and used. The applicability of these chemical and non-chemical alternatives falls within the scope of the BPR as the substitution of creosote is dependent on the approval of creosote as a biocidal substance, which, at the time of preparing this dossier, is under way to be decided. Moreover, based on the risk assessment performed during the reassessment of creosote approval, risk was highlighted as acceptable solely for railways sleepers, bridge over pond and tolerable for support poles installation. Thus, socio-economical impact of the proposed restriction on secondary uses of creosote-treated wood not authorised under BPR was not performed, as these uses were not authorised under BPR and that risks were highlighted during assessment.

The prohibition of all secondary-use is common to both RO1 and RO2. As RO2 would allow treated-wood to be reused, this possibility is in line with the recommendation set out in the WFD regarding the priority of waste treatment and the actual European Commission strategy promoting circular economy, preventing waste generation and promoting reuse of material and energy when possible. RO1, by totally prohibiting the possibility of reuse, goes against these recommendations, even if it potentially will be more efficient in risk reduction if considering that it would then lead to replacement with alternatives of creosote-treated woods. This is dependent on the alternatives choosen by the managers in charge of replacing old creosote-treated wood as these old articles can be replaced by safer alternatives but also by freshly treated wood. There is no data available to measure what would be decided in such case. By allowing reuse, RO2 would allow a residual risks for environment and human health, as it was considered that the risks posed by creosote-treated wood will remain the same as primary use highlighted by BPC. **Of course, the future decisions concerning creosote approval conditions and the conditions for marketing authorisation of creosote based- products respectively at European or national level, will affect directly the assessment and might change the hierarchy between R01 and R02.**

2.3.5. Economic impacts assessment

Considering the above analysis in this dossier, and with the currently anticipated outcome of the reapproval process in the BPR framework, RO2 appears to the DS as the most appropriate option. As a consequence, only RO2 is further evaluated quantitatively in this restriction proposal, with the impacts of RO1 being qualitatively presented for information *(see Section 2.3.9)***.**

Specifically related to creosote-treated wood used for railway sleepers and their reuse (demonstrated in this proposal as being the sole reuse which is not marginal), the following observation (applicable to both RO1 and RO2) need to be kept in mind.

In regards to BPR, creosote treated-wood should comply with the BPC opinion conclusions and observations to minimise risks. Labelling and associated obligatory instructions must state that all treated timber must be undertaken at industrial sites where application processes must be carried out within a contained area; situated on impermeable hard standing, with bunding to prevent run-off and a recovery system in place (e.g. sump), and that freshly treated timber shall be stored after treatment under shelter or on impermeable hard standing, or both, to prevent direct losses to soil, sewer or water, and that any losses of the product shall be collected for reuse or disposal.

In case of storage of creosote treated timber (temporarily) at other sites than impregnation facilities (e.g. the readiness stocks of transmission poles at the site of installation), it should be stored on an impermeable hard standing or on an absorptive material (e.g. bark) as well as under shelter (e.g. roof or covered with a tarpaulin), and if stored in residential or recreational areas an access by general public should be restricted (e.g. using a fence or a cover). **It should be clear that the same safety considerations as for fresh treated timber shall be put in place when creosote treated wood is reused for the same purpose or stocked according to BPR and REACH provisions.**

As expressed by the BPC Opinion, wooden sleepers shall not be temporarily stored for long periods. Impregnated wooden sleepers shall not be temporarily stored in groundwater areas. Measures should be taken at temporary storage sites to prevent unauthorised access e.g. by fencing or covering and should normally not be accessible for the general public. For more permanent storage sites treated articles should be stored on an impermeable hard standing or on an absorptive material (e.g. bark) to prevent runoff to the environment. Furthermore, the materials should be stored under shelter or covered with a tarpaulin. Access to the general public should be prevented, e.g. using a fence. Any spill or contaminated material must be collected and disposed as hazardous waste. Creosote treated articles should be labelled with these conditions for storage.

As highlighted by the Finnish Transport Infrastructure Agency (FTIA) when questionned, "*sleepers storage and treatment aren't located in groundwater area and these are away from domestic water wells. If this is not possible, the treatment area for harmful substances must be protected with water-impermeable protection. If necessary, water from such areas is diverted through a separation well either to a sewer or by pipeline away from the groundwater area.*"

The DS estimated that 26,000 to 56,000 creosote-treated railway sleepers are reused each year by users other than the original user across the EEA (touristic railways, other private railroads, etc.; see Annex B for details on the calculation of use

volumes). These second-hand sleepers are sold or transferred free of charge by NRIMs to private railway managers. Without implementation of the proposed restriction, it is estimated that this volume would remain constant over the next several decades, as noted by the MSCAs and NRIMs consulted during the elaboration of this dossier. This assumption seems relevant to the Dossier Submitter given that the stakeholders involved - small private rail infrastructure managers - can maintain their network at a lower cost through the reuse of second-hand creosote-treated sleepers.

The entry into force of the proposed restriction would force private rail infrastructure managers to install - instead of second-hand creosote-treated sleepers - new wooden sleepers treated with creosote[24] or copper hydroxide products, or plastic composite sleepers (consultation of Finnish and French NRIM, 2021), the latter being considered as alternatives to creosoted sleepers (for more details about alternatives, please refer to Annex E.2). The installation of concrete sleepers would require modification of the track superstructure. This would generate significant construction costs (ballast lifting, rail changes). Given the market actors and infrastructures targeted by the proposed restriction, concrete sleepers are not considered to be a relevant alternative from an economic perspective by the Dossier Submitter. NRIMs surveyed during the elaboration of this dossier confirmed tis assumption by ointing out that only alternatives based on treated wood were relevant under the proposed restriction.In addition, the proposed restriction would result in a revenue loss for NRIMs from the no-longer permitted sale of creosote-treated sleepers that could be reused (by users other than the original ones), as well as additional costs associated with the disposal of creosote-treated sleepers at the end of their service-life.

Given the average service-life of a reused creosote-treated sleeper (approximately 20 to 30 years) and the constant reuse volumes, the Dossier Submitter considers that the proposed restriction would affect **a total stock of 520,000 to 1,680,000 sleepers[25] in place** which are renewed through the reuse of second-hand creosoted sleepers over a 20 to 30 year cycle under a Baseline scenario (see Figure 1 below).

[24] The possibility to substitute reused creosote-treated wooden sleepers with new creosote-treated wooden sleepers is contingent upon the issuance of an authorization for this substance under the BPR. The issuance of such an authorization is considered likely by the Dossier Submitter at the time of preparation of this dossier.

[25] 520,000 sleepers = 26,000 sleepers/year*20 years; 1,680,000 sleepers = 56,000 traverses/year*30 years.

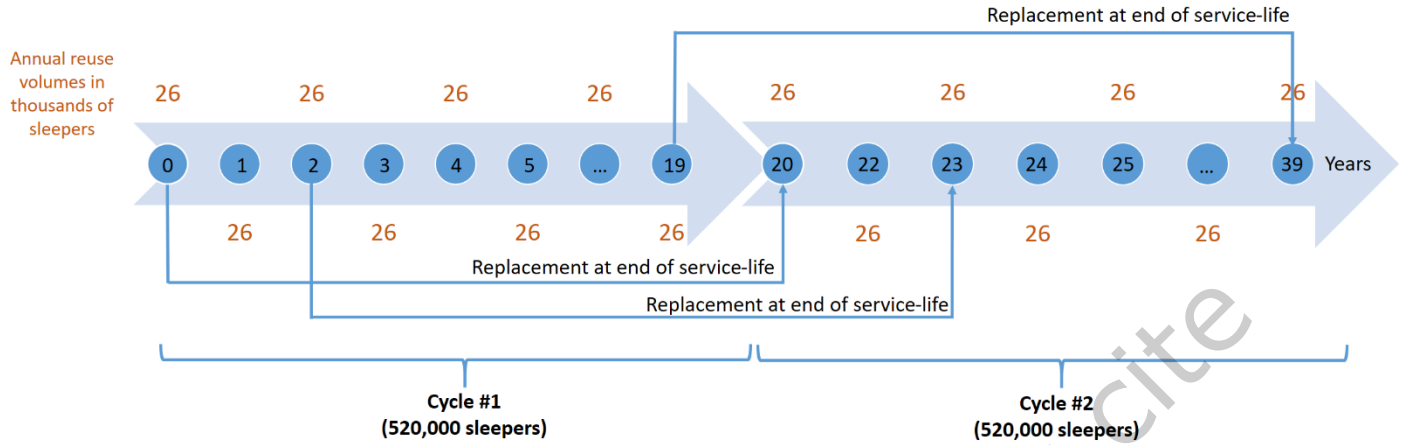

Figure 1:Reuse cycle of creosoted railway sleepers in private railroads in the EE31 (Considered scenario: annual reuse volumes = 26,000 sleepers, service-life = 20 years)

The Dossier Submitter quantified the extra-cost triggered by the proposed restriction to private railways managers and NRIMs. This extra-cost was quantified while considering a 40 years-period from the time the restriction comes into effect in early 2024 (2024-2063) as well as 20 and 40 years service-life for a reused creosote-treated wooden sleeper and new sleepers respectively (restriction scenario). Three additional combinations of time horizons and service-life were considered in the sensitivity analysis to account for the uncertainty regarding the service-life of a reused creosote-treated sleeper and new sleepers:

- 2024-2053: A 30 years-period from the time the restriction comes into effect in early 2024. For this scenario, a 20-years service-life was considered for a reused creosote-treated wooden sleeper; In the following, this scenario will be indicated as “30/20”.
- 2024-2063: A 40 years-period from the time the restriction comes into effect in early 2024. For this scenario, a 30 years service-life was considered for a reused creosote-treated wooden sleeper; In the following, this scenario will be indicated as “40/30”.
- 2024-2073: A 50 years-period from the time the restriction comes into in early 2024. For this scenario, a 30-years service-life was considered for a reused creosote-treated wooden sleeper. In the following, this scenario will be indicated as “50/30”.

These time horizons are defined on the basis of the service-life considered for a new sleeper (creosote- or copper hydroxide-treated wood and composite sleeper). Measuring the economic impact of the restriction on the basis of the service-life of new alternative sleepers and not of reused creosote-treated wooden sleepers makes it possible to account for the evolution of the annual maintenance costs of the railway network following the implementation of this restriction. Indeed, the introduction of longer service-life sleepers will reduce the rate of renewal of sleepers and allow the distribution of these maintenance costs over a longer period of time, as the renewal of sleepers can be delayed by a few years (SNCF hearing). For example, it is possible to renew a stock of 520,000 sleepers in place in 40 years instead of 20 years ("restriction - smoothing replacement costs" scenario, see Figure 2). However, the Dossier Submitter also quantified the economic impact of the proposed restriction by considering that such a smoothing approach was not possible ("restriction upholding replacement schedule" scenario, see Figure 2). Figure 2 below illustrates the

Dossier Submitter's approach and the two time sequences considered for sleepers replacement.

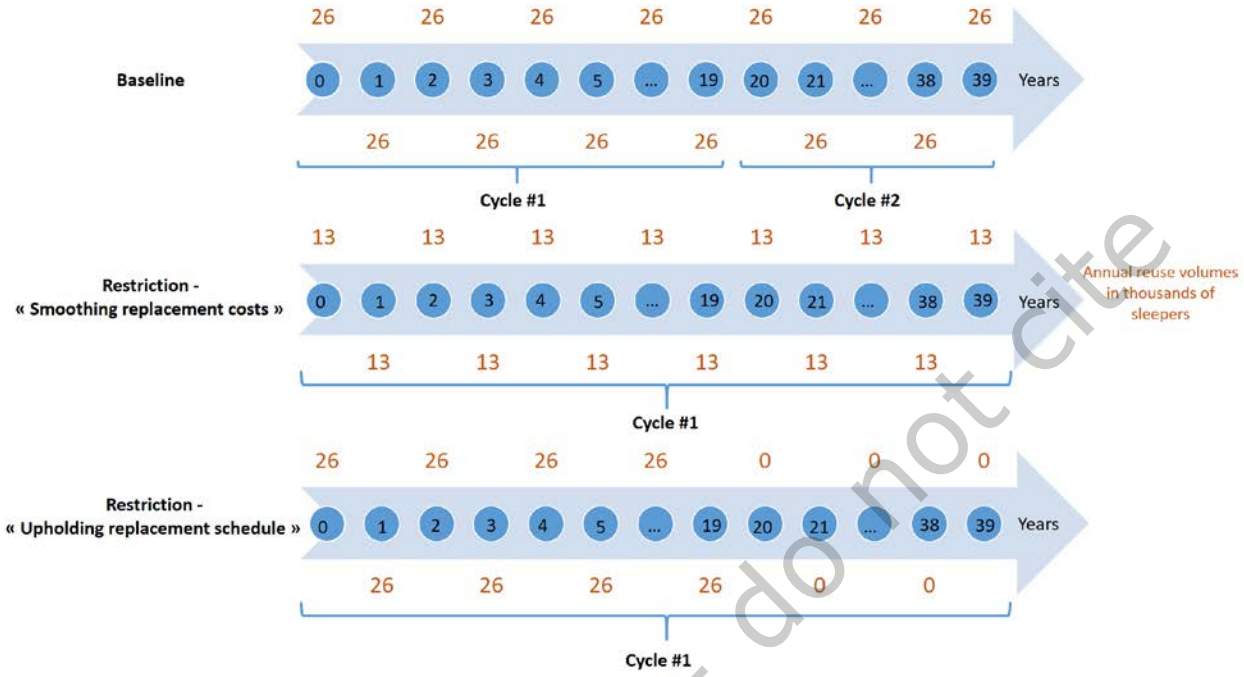

Figure 2: Comparison of reuse volumes and replacement schedule between Baseline and restriction scenarios (considered scenario: annual reuse volumes = 26,000 sleepers, reused sleepers service-life = 20 years, new sleepers service-life = 40 years)

Given the information in its possession and the short time available for the preparation of this dossier, the DS was not able to assess the benefits induced by the proposed restriction (i.e., in terms of environmental and human health impacts) from an economic perspective. The non-monetary costs and indirect costs associated with this restriction have also not been quantified but are discussed qualitatively at the conclusion of this section (see Section 2.3.5.3).

2.3.5.1. Cost of substituting second-hand railway sleepers with new sleepers for private railways managers

Under the proposed restriction, the substitution of reused creosote-treated wooden sleepers with new wooden (treated with creosote or copper hydroxide) and composite alternative sleepers is considered likely to alter railroad overall costs in three ways:

- Through acquisition costs, with new sleepers displaying a higher acquisition cost than reused sleepers (see Table 11);

- Through maintenance costs (monitoring, intervention, and tamping costs) for which the Dossier Submitter assumed (based on the ChemAdvocacy report, 2014)[26] that they vary according to the material and not according to the substance used for the biocidal treatment, but also according to the heterogeneity of sleepers in terms of material used (i.e., wood and composite sleepers; see Table 12 to Table 15).

- Through service-life, which when extended, decreases the sleepers' renewal rate and thus the annual installation cost.

Table 11 below provides all the characteristics of the four types of sleepers considered in terms of service-life and acquisition cost. Table 12 to Table 15 present the installation and maintenance costs for the different types of sleepers used in the economic impact assessment. All of the cost data used in the impact assessment are adapted from the report elaborated by Chem Advocacy for SNCF Réseau (Chem Advocacy, 2014). The Dossier Submitter used these values to build ranges for each type of cost. The initial costs, expressed in euros 2010 were adjusted for inflation and expressed in euros 2021-09 using the index for public works costs for civil engineering works (Insee, 2021)[27]; the value obtained constitutes the upper bound of the considered range. The lower bound corresponds to a quarter of the cost for SNCF Réseau to account for the smaller costs of small infrastructure managers (Conseil National du Tourisme, 2013, p20)[28]. The representativeness of these values for the railway infrastructures managers targeted by the proposed restriction could not be verified by the Dossier Submitter given the short amount of time available for the elaboration of this dossier. The public consultation on the dossier may bring information on this issue. Since these alternatives do not require any modification of the track superstructure, no construction costs are considered in the evaluation.

[26] Evaluation De La Faisabilite Technique Et Economique De La Substitution De La Creosote Pour L'usage De Protection Du Bois Utilise En Traverses De Chemin De Fer, CHEMAdvocacy, 2014, confidential report.

[27] https://www.insee.fr/en/statistiques/6009943

[28] The report published by the French National Tourism Council in 2013 on the future of tourist railroads highlighted the significant cost differences between these railroads and SNCF Réseau: the cost, excluding tax, of a sleeper is estimated at 70 euros when installed in a tourist railroad and 250 euros for a French national network line. This difference is attributed to the different nature of the contracting authorities, but also to the different operating and safety standards that apply to these tracks (Conseil National du Tourisme, 2013, p20).

Table 11: Service-life and acquisition cost of different types of railway sleepers (creosoted and alternative)

	Service-life			Acquisition cost		
	Service-life (years)	**Source**	**Uncertainty**	**Acquisition cost (€2021)**	**Source**	**Uncertainty**
Wood treated with creosote - REUSED	**[20 ;30]**	French and Finnish NRIMs	Potentially shorter service-life in Northern MS	**[10;15]**	Hearing SNCF Réseau	
Wood treated with creosote - NEW	**[30 ;50]** 30-40 years (50 years or even more on low-traffic lines); some contributions from manufacturers report lifetimes of 50 to 60 years	BPC consultation BPC, hearing SNCF Réseau, (CGEDD, 2017)		**[20 ;100]**	BPC consultation (including input from French authorities); (Chem Advocacy, 2014)	
Wood treated with copper hydroxyde - NEW	**[30 ;50]** 40-50 year service-life (equivalent performance to creosote treatment) for oil-based substances	BPC consultation		**[100 ;200]**	BPC consultation (including input from French authorities) reporting that copper-treated sleepers are at least three times more expensive than creosote-treated equivalents	
Composite - NEW	**[30 ;50]** 40 years	BPC consultation	Significant uncertainty on the service-life of these sleepers	**[500** in 2022 with **a yearly 3.5% decrease;**	BPC consultation (including input from French authorities)	The contributions to the BPC consultation indicated that it could take about ten years to reach technological maturity for composite sleepers. Such a

	Contributions in the framework of the BPC consultation reported performances being close to those of creosoted wooden sleepers			**500** in 2022 with **a yearly 1.5% decrease]**		development would be accompanied by a gradual price decrease. However, there are still uncertainties about the development of this market. Indeed, the development of promising substances for the treatment of wood based on copper hydroxide may raise doubts about the widespread adoption of composite sleepers by NRIMs (hearing SNCF Réseau). However, this price decrease will only take place if this alternative is adopted by the latter.

Table 12: Installation cost of different types of railway sleepers (creosoted and alternative)

	€2010/sleeper	€2021-09/sleeper
Wood treated with creosote – REUSED	[40.5 ;162]	[50.1 ; 200.4]
Wood treated with creosote – NEW	[40.5 ;162]	[50.1 ; 200.4]
Wood treated with copper hydroxide – NEW	[40.5 ;162]	[50.1 ; 200.4]
Composite – NEW	[40.5 ;162]	[50.1 ; 200.4]

The installation cost includes the labor and machinery required for work directly related to the sleeper replacement. Sleepers' replacements may require increased mobilization of labor and machinery, which will likely have a significant impact on the installation cost of new sleepers. We define installation cost as the total replacement cost excluding materials (ChemAdvocacy, 2014).

Once installed, sleepers are subject to maintenance. Three types of maintenance costs are considered:

- The monitoring cost expressed in €/km (kilometer equivalent of the number of sleepers): this cost varies according to the type of material but also to the mix of sleepers installed. Thus the monitoring cost is identical for reused sleepers and new sleepers treated with creosote or copper hydroxide. The lower monitoring cost for new plastic composite sleepers is applied to the entire stock of sleepers under consideration since the installation of these sleepers induces heterogeneity (Chem Advocacy, 2014);

- The intervention cost expressed in €/number of sleeper units installed: this cost varies according to the type of material (Chem Advocacy, 2014);

- The tamping cost, also expressed in €/km (kilometer equivalent of the number of sleepers): this cost also varies according to the type of material but also to the mix of sleepers installed. Thus the cost of tamping is identical for reused sleepers and new sleepers treated with creosote or copper hydroxide. The higher cost for new composite plastic sleepers is applied to the entire sleepers stock under consideration since the installation of these sleepers induces heterogeneity (Chem Advocacy, 2014).

Table 13: Monitoring cost of different types of railway sleepers (creosoted and alternative)

	€2010/km	€2021-09/km
Wood treated with creosote - REUSED	[237.75 ; 951]	[294.1 ; 1,176.38]
Wood treated with creosote - NEW	[237.75 ; 951]	[294.1 ; 1,176.38]

Wood treated with copper hydroxide - NEW	[237.75 ; 951]	[294.1 ; 1,176.38]
Composite - NEW	[228.25; 913]	[282.35; 1,129.38]

Table 14: Intervention cost of different types of railway sleepers (creosoted and alternative)

	€2010/km	€2021-09/km
Wood treated with creosote - REUSED	[0.033 ; 0.13]	[0.04;0.16]
Wood treated with creosote - NEW	[0.033 ; 0.13]	[0.04;0.16]
Wood treated with copper hydroxide - NEW	[0.033 ; 0.13]	[0.04;0.16]
Composite - NEW	[0,0175; 0.07]	[0.02;0.09]

Table 15: Tamping cost of different types of railway sleepers (creosoted and alternative)

	€2010/km	€2021-09/km
Wood treated with creosote – REUSED	[285.25 ; 1,141]	[352.85 ; 1,411.4]
Wood treated with creosote – NEW	[285.25 ; 1,141]	[352.85 ; 1,411.4]
Wood treated with copper hydroxide - NEW	[285.25 ; 1,141]	[352.85 ; 1,411.4]
Composite – NEW	[347.5 ; 1,390]	[429.86 ; 1,719.43]

Note that maintenance costs are not calculated on the same basis as sleepers' replacement costs. Replacement costs are estimated on the basis of the flow of replaced sleepers, while maintenance costs are calculated on the network stock (in kilometers or number of sleepers) having been replaced since the beginning of the analysis period. Figure 3 below shows the definition of both scopes.

Figure 3: Definition of the scopes for the calculation of replacement and maintenance costs triggered by the proposed restriction (Considered scenario annual reuse volumes = 26,000 sleepers, service-life reused sleepers = 20 years, service-life new sleepers = 40

***: the number of sleepers in place corresponds to the size of the stock of sleepers (in number of units or km equivalent) being renewed through the reuse of creosoted used sleepers (i.e., 520,000 sleepers for the scenario considered here)**

The extra-cost (acquisition, installation, and maintenance costs) incurred under the restriction scenario with respect to the Baseline scenario is calculated annually for the entire analysis period for the lower and the upper bound of the use volume range (i.e., 26,000 and 56,000 used sleepers being reuse each year). The annual extra-cost is then incorporated into a NPV – considering a discount rate of 4% for time horizons up to 30 years and 2% beyond 30 years – and annualized NPV calculation (discounted at 4% over the entire analysis period from 2024).

Given the significant level of uncertainty regarding the value of each of the parameters (service-life of new and reused sleepers, acquisition costs and maintenance costs), **the cost triggered by the restriction is first calculated for each type of alternative sleeper and for each replacement schedule** (see Figure 2) **under the following restriction scenario considered as conservative**:

- Average acquisition cost ;
- Minimum installation and maintenance costs ;
- Service-life of used creosoted sleepers: 20 years ;
- Service-life of alternative (new) sleepers: 40 years.

A sensitivity analysis is then performed to determine the impact of a variation of the following parameters on the cost of the restriction:

- Variation in the service-life of used and alternative (new) sleepers ;

- Variation in the acquisition cost of used and alternative sleepers ;
- Variation (increase) in the installation and maintenance cost.

Results –Restriction scenario:

Table 16: Annualized net present value of extra-costs (in million euros) and percent change in ANPV of costs incurred by private railways managers due to the proposed restriction

	Wood treated with creosote – NEW	Wood treated with copper hydroxide - NEW	Composite - NEW
Annual reuse volumes = 26,000 sleepers - Smoothing replacement costs	-0.23 (-11%)	1.13 (+53%)	3.82 (+177%)
Annual reuse volumes = 56,000 sleepers - Smoothing replacement costs	-0.49 (-11%)	2.44 (+53%)	8.23 (+177%)
Annual reuse volumes = 26,000 sleepers - Upholding replacement schedule	0.15 (+7%)	1.82 (+85%)	6.29 (+292%)
Annual reuse volumes = 56,000 sleepers - Upholding replacement schedule	0.32 (+7%)	3.92 (+85%)	13.56 (+292%)

Under the restriction scenario, the substitution of reused creosote-treated wooden sleepers with new wooden sleepers treated with creosote would result in cost savings for private railway managers if the replacement is spread over time (i.e., "smoothing replacement costs"). These cost savings were estimated by the DS to approximately €490,000 to €230,000/year depending on the use volumes considered (corresponding to an 11% decrease in annualized total costs compared to the Baseline scenario). These savings are allowed by the spreading of the volumes of sleepers to be replaced over a longer period of time, resulting in lower annual installation costs, combined with the relatively low acquisition cost of new creosoted sleepers (see Figure

4). **However, if the replacement is performed under the "upholding replacement schedule", the installation costs are not reduced and the DS estimates the additional cost of replacing reused creosote-treated wooden sleepers with new wooden sleepers treated with creosote to be approximately €150,000 to €320,000/year depending on the volumes of use considered (corresponding to a 7% increase in annualized total costs compared to the Baseline scenario**; for details please see Table 16).

On the other hand, the substitution of reused creosote-treated wooden sleepers with new wooden sleepers treated with copper hydroxide and new composite sleepers would trigger extra-costs estimated by the DS to be between €1.1 and €8.2 million/year if the replacement is spread over time (corresponding to a 53% to 177% increase in annualized total costs compared to the Baseline scenario). Here, the savings in installation costs allowed by spreading of the volumes of sleepers to be replaced do not compensate for the higher acquisition costs of these alternative sleepers (see Figure 4). **The DS estimated that extra-costs range between €1.8 and €13.6 million if the replacement is carried out according to the "upholding replacement schedule" (i.e. an 85% to 292% increase in annualized total costs compared to the Baseline scenario**; for details please see Table 16).

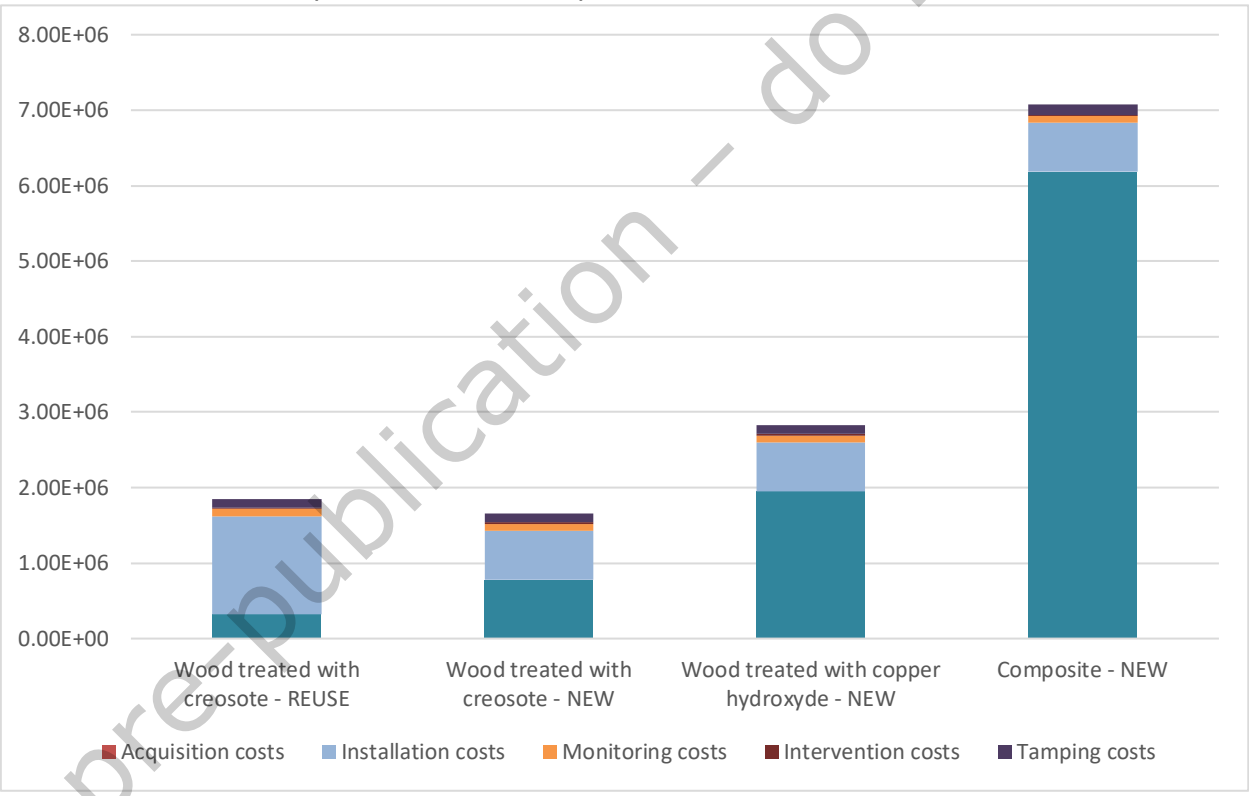

Figure 4: Comparison of 2024 costs triggered by the substitution of reused creosote-treated wooden sleepers with new alternative sleepers (considered scenario: main scenario, reuse volumes = 26,000 sleepers/year, replacement schedule: "smoothing replacement cost")

<u>Sensitivity analysis - Variation in the service-life of used and alternative (new) sleepers:</u>

Table 17 below presents the results of the sensitivity analysis for the substitution of reused creosoted sleepers with new creosoted sleepers only. Indeed, the impact of the variation in the service-life of reused and new sleepers on the cost of the restriction is identical (in terms of trend) independently of the alternative considered. It can be seen that **the substitution of reused creosote-treated wooden sleepers with new creosote-treated wooden sleepers only results in cost savings for private railway managers when the service-life of reused sleepers and of new sleepers is 20 years and 40 years respectively and the replacement spread over time. For the other values considered, this same substitution results in additional costs ranging from €110,000 /year to approximately €1.5 million/year** (corresponding to a 4.6% to 31% increase in annualized total costs compared to the Baseline scenario).

Depending on the service-life considered, the substitution of reused creosote-treated wooden sleepers with new wooden sleepers treated with copper hydroxide or composite sleepers would result in extra-costs ranging approximately from €1 million/year to €6 million/year and €4 million/year to €17 million/year respectively.

The cost induced by the proposed restriction decreases as the ratio of the service-life of new to reused sleepers increases, allowing the replacement costs to be spread over a longer time period (and in particular the installation costs compared to the baseline).

Table 17: Impact of a variation in the service-life on the annualized net present value and percent change in extra-costs (in million euros) incurred by private railways managers (substitution with new wooden creosoted sleepers)

Service-life new sleepers/service-life reused creosoted sleepers	30/20	40/20	40/30	50/30
Annual reuse volumes = 26,000 sleepers - Smoothing replacement costs	0.29 (+15.18%)	**-0.23** **(-11%)**	0.60 (+26.5%)	0.11 (+4.6%)
Annual reuse volumes = 56,000 sleepers - Smoothing replacement costs	0.63 (+15.18%)	**-0.49** **(-11%)**	1.30 (+26.5%)	0.25 (+4.6%)
Annual reuse volumes = 26,000 sleepers - Upholding replacement schedule	0.65 (+33.63%)	**0.15** **(+7%)**	0.71 (+30.92%)	0.34 (+13.5%)

Annual reuse volumes = 56,000 sleepers - Upholding replacement schedule	1.39 (+33.63%)	**0.32 (+7%)**	1.52 (+30.92%)	0.72 (+13.5%)

Sensitivity analysis - Variation in the acquisition cost of used and alternative sleepers:

Table 18 below presents the results of the sensitivity analysis for the substitution of reused creosoted sleepers with new creosoted sleepers only. Indeed, the impact of the variation in the acquisition cost of reused and new sleepers on the cost of the restriction is identical (in terms of trend) independently of the alternative considered: as it can be expected the cost induced by the proposed restriction increases as the acquisition cost increases. It can be seen that **the substitution of reused creosote-treated wooden sleepers with new creosote-treated wooden sleepers only results in cost savings** (from €1,6 million/year to €230,000/year) **for private railway managers for low and average cost levels and if the replacement is spread over time** (and for low cost under the "upholding replacement schedule")**. For the other values considered, this same substitution results in additional costs approximately ranging from €150,000 /year to approximately €1.8 million/year** (annualized net present value of extra-costs, for details please see Table 18).

Depending on the service-life considered, the substitution of reused creosote-treated wooden sleepers with new wooden sleepers treated with copper hydroxide or composite sleepers would result in extra-costs ranging approximately from €450,000/year to €6 million/year and €3 million/year to €15 million/year respectively (annualized net present value of extra-costs)**.**

Table 18: Impact of a variation in the acquisition cost of sleepers on the annualized net present value of extra-costs (in million euros) incurred by private railways managers (substitution with new wooden creosoted sleepers)

Acquisition cost (in €/sleeper)	Low : 20	Average : 60	High : 100
Annual reuse volumes = 26,000 sleepers - Smoothing replacement costs	-0.76	**-0.23**	0.30
Annual reuse volumes = 56,000 sleepers - Smoothing replacement costs	-1.63	**-0.49**	0.65

Annual reuse volumes = 26,000 sleepers - Upholding replacement schedule	-0.52	**0.15**	0.82
Annual reuse volumes = 56,000 sleepers - Upholding replacement schedule	-1.11	**0.32**	1.76

Sensitivity analysis - Increase in the installation and maintenance cost:

Table 19 below presents the results of the sensitivity analysis for the substitution of reused creosoted sleepers with new creosoted sleepers only. Indeed, the impact of the variation in installation and maintenance costs of reused and new sleepers on the cost of the restriction is identical (in terms of trend) independently of the alternative considered. **An increase in installation and maintenance costs reduces the cost of the proposed restriction. Since the maintenance costs applied to the different types of sleepers are close (or identical for reused and new wooden sleepers treated with creosote or copper hydroxide), it is the increase in total installation costs that induces this result. Indeed, as mentioned above, replacing the reused creosoted sleepers with new sleepers displaying a longer service-life will reduce the renewal rate of the sleepers and thus reduces the annual installation cost. This effect may offset the higher acquisition costs of alternative ties and result in cost savings for private railway managers.**

It can be seen that the substitution of reused creosote-treated wooden sleepers with new creosote-treated wooden sleepers results in cost savings (from €5.4 million/year to €230,000/year) for private railway managers for both cost levels and if the replacement spread over time (and for high costs under the "upholding replacement schedule").

Depending on cost-level considered, the substitution of reused creosote-treated wooden sleepers with new composite sleepers would result in extra-costs ranging approximately from €1.6 million/year to €13.6 million/year (annualized net present value of extra-costs). **If installation and maintenance costs are high and if the replacement spread over time, the substitution of reused creosote-treated wooden sleepers with new wooden sleepers treated with copper hydroxide would induce cost savings for private railway managers ranging approximately from €1.1 to €2.5 million/year depending on the use volumes considered. Otherwise, the substitution of reused creosote-treated wooden sleepers with new wooden sleepers treated with copper hydroxide would result in extra-costs ranging approximately from €60,000/year to €4 million/year (annualized net present value of extra-costs).**

Table 19: Impact of a variation in the maintenance and installation cost of sleepers on the annualized net present value of extra-costs (in million euros) incurred by private railways managers (substitution with new wooden creosoted sleepers)

Level of maintenance and installation costs	Min	Max
Annual reuse volumes = 26,000 sleepers - Smoothing replacement costs	**-0.23**	-2.50
Annual reuse volumes = 56,000 sleepers - Smoothing replacement costs	**-0.49**	-5.39
Annual reuse volumes = 26,000 sleepers - Upholding replacement schedule	**0.15**	-1.61
Annual reuse volumes = 56,000 sleepers - Upholding replacement schedule	**0.32**	-3.47

2.3.5.2. Revenue losses and cost for waste disposal for national rail infrastructure managers

As mentioned above, the proposed restriction would result in a **revenue loss for NRIMs from the sale of creosote-treated sleepers that could be reused, as well as additional costs associated with the disposal of creosote-treated sleepers at the end of their service-life.**

It should be noted that the latter additional disposal costs should be considered a transfer. Indeed, under the Baseline scenario, this same cost is in principle borne by the private railway managers that reuse creosoted sleepers. Under the proposed restriction, these costs are simply transferred from these managers to the NRIMs.

The extra-costs borne by the NRIMs under the proposed restriction were calculated for the lower and upper bounds of the use volumes range and each replacement schedule (see Figure 2) **while considering the following parameters**:

- Use volumes : [26,000 ; 56,000]
- Service-life of used creosoted sleepers: 20 years ;
- Service-life of alternative (new) sleepers: 40 years ;
- Price of used creosoted sleepers available for reuse : [€10;€15]

- Unit disposal cost (per sleeper, including transportation cost) : €8.5/sleeper

The value of these last two parameters was established from the hearing conducted with SNCF Réseau.The representativeness of these values for the other NRIMS targeted by the proposed restriction could not be verified by the Dossier Submitter given the short amount of time available for the elaboration of this dossier.

Depending on the reuse volumes and the price of a used sleeper considered, the revenue loss caused by the proposed restriction varies from €300,000/year to €980,000/year (annualized NPV discounted at 4% over 40 years).The additional disposal costs range from €260,000 to €550,000/year (for details please see Table 20).

Table 20: Annualized net present value of revenue losses (in million euros) incurred by NRIMs due to the proposed restriction (annualized NPV discounted at 4% over 40 years)

Price of used creosoted sleepers available for reuse	10€	12.5€	15€
Annual reuse volumes = 26,000 sleepers	0.30	0.38	0.45
Annual reuse volumes = 56,000 sleepers	0.65	0.82	0.98

Table 21: Annualized net present value of disposal costs (in million euros) incurred by NRIMs due to the proposed restriction (annualized NPV discounted at 4% over 40 years)

	Disposal cost
Annual reuse volumes = 26,000 sleepers	0.26
Annual reuse volumes = 56,000 sleepers	0.55

2.3.5.3. Conclusion and discussion on the costs

Table 22 below summarizes the total costs expected from the proposed restriction (RO2) and their distribution between the NRIMs and the private railway managers (annualized net present value of costs discounted at 4% over the entire analysis period from 2024) when the substitution of reused sleepers is spread over time ("smoothed replacement costs").[29] **The**

[29] This replacement schedule appears as the most relevant one to the DS. Indeed, the hearing conducted with SNCF Réseau indicated that the railway managers affected by the proposed restriction had some leeway in the timing of sleepers' replacement.

total cost of the restriction ranges from approximately €150,000/year to €9 million/year for the restriction scenario depending on the reuse volume and the alternative considered.

Table 22: Annualized net present value of total costs induced by the proposed restriction (restriction scenario and smoothed replacement costs)

		Wood treated with creosote - NEW	Wood treated with copper hydroxide - NEW	Composite – NEW
Annual reuse volumes = 26,000 sleepers	Private railway managers (million euros)	-0.23	1.13	3.82
	NRIM (million euros)		0.38	
	***TOTAL* (million euros)**	**0.15**	**1.51**	**4.2**
	Total unit cost/replaced sleeper (euro/sleeper)	5.77	58.1	161.54
Annual reuse volumes = 56,000 sleepers	Private railway managers (million euros)	-0.49	2.44	8.23
	NRIM (million euros)		0.82	
	***TOTAL* (million euros)**	**0.33**	**3.26**	**9.05**
	Total unit cost/replaced sleeper (euro/sleeper)	5.89	58.21	161.61

The additional costs incurred by NRIMs can be considered as marginal (SNCF hearing) and the proposed restriction is unlikely to affect these companies and their activities significantly (i.e. no impact on the quality or price of transport services).

However, given the significant uncertainties in the various parameters considered, it is less easy to conclude on the economic impacts of this proposed restriction on private railway managers and associated activities. The DS expects the public consultation to bring additional information to help it reach a clearer conclusion on this point.

For all of the scenarios considered, the substitution of reused creosoted sleepers with new composite sleepers is likely to result in significant additional costs for

these managers (e.g. an increase of 177% to 292% in the annualized net present value of total costs compared to the baseline scenario for the main restriction scenario) **and does not appear to be relevant. Substitution based on wooden sleepers treated with copper hydroxide can also generate significant additional costs for most of the scenarios considered** (53% to 85% increase in the annualized net present value of total costs compared to the baseline scenario for the main restriction scenario).

However, a reduction in the acquisition cost of this type of sleeper could make this alternative feasible, similarly to a substitution based on new creosoted wooden sleepers. Table 23 below shows the extra-cost triggered by the restriction if creosote is not allowed under the BPR. In this scenario, a yearly 2.5% decrease was applied to the acquisition cost of wooden sleepers treated with copper hydroxide to simulate the development of this alternative. The substitution of reused creosote-treated wooden sleepers with new wooden sleepers treated with copper hydroxide only results in cost savings (from €70,000/year to €160,000/year) for private railway managers for low acquisition cost levels and if the replacement is spread over time. For the other values considered, this same substitution results in additional costs approximately ranging from €350,000 /year to approximately €4 million/year (annualized net present value of extra-costs, for details please see Table 23). Such a price decrease is considered likely by the DS on the basis of the contributions gathered in the framework of the BPC consultation and the elaboration of this dossier. Indeed, oil-based copper hydroxide biocidal products are likely to be used by EU NRIMs within the coming years, which could lead to such a price decrease. However, such a price reduction is conditioned on the one hand by the market structure (unlikely under a monopolistic market structure) and on the other hand by the capacity of the supply to satisfy the demand in terms of demanded quantity.

Table 23: Impact of a variation in the acquisition cost of sleepers on the annualized net present value of extra-costs (in million euros) incurred by private railways managers (substitution with new wooden sleepers treated with copper hydroxide)

Acquisition cost (in €/sleeper)	Low : 100	Average : 150	High : 200
Annual reuse volumes = 26,000 sleepers - Smoothing replacement costs	-0.07 (-4%)	**0.35** **(+16%)**	0.83 (+37%)
Annual reuse volumes = 56,000 sleepers - Smoothing replacement costs	-0.16 (-4%)	**0.76** **(+16%)**	1.8 (+37%)
Annual reuse volumes = 26,000 sleepers - Upholding replacement schedule	0.56 (+27%)	**1.21** **(+56%)**	1.86 (+83%)

Annual reuse volumes = 56,000 sleepers - **Upholding replacement schedule**	1.21 (+27%)	**2.6** **(+56%)**	4 (+83%)

On the other hand, the substitution of reused creosoted sleepers with new wooden sleepers treated with creosote may be a favorable solution in terms of costs for the private railway managers. **When substitution is spread over time, the proposed restriction provides cost savings to managers under the main restriction scenario as well as for high installation and maintenance costs. The cost associated with substitution based on new wooden sleepers treated with creosote is sensitive in particular to the ratio of the service-life of the new sleepers to the reused sleepers. However, for most of the ratios considered, and if the substitution is spread over time, the extra-costs of substitution can be considered as moderate** (see Table 17).

With regard to tourist railroads, it is difficult to conclude on the impact of such extra-costs, even if moderate, on the functionning of these structures and their sustainability. Indeed, the report of French National Tourism Council (CNT, 2013)[30] pointed out the significant heterogeneity of this sector, in which some infrastructures are managed by associations, others by local authorities and others by private companies. The same report also pointed out that a process of professionalization was underway in this sector, particularly in order to ensure the capacity of these managers to renew their infrastructures. This report also mention that these structures receive little or no public funding, when privately managed. However, the French Federation of Tourist Railways and Railway Museums mentions, that the investment in infrastructure and buildings is generally financed by the local authorities in return for economic benefits for their territories and sometimes rents (UNECTO, 2022)[31]. The DS also expects the public consultation to provide additional elements on this issue.

Besides, the DS is not able to discuss the indirect impact of these potential extra-costs for other types of private railroad managers (industrial facilities, etc.). The Finnish NRIMs, surveyed as part of the elaboration of this dossier pointed out that the proposed restriction could cause the freight traffic to end on some sidings, however the DS was not able to confirm and assess the representativeness of such impact in the EEA.

The DS was not able to quantify the environmental and human health costs induced by the proposed restriction. Indeed, this cost is likely to increase if the alternatives considered have a less favourable life cycle than the reused sleepers from an environmental and human health perspective. Such a question was raised in particular concerning composite sleepers as part of the BPC consultation. Finally, this restriction leads to a shorter “total service-life” of creosote-treated wooden sleepers used by the NRIMs and that are reused in the Baseline scenario. This could result in increased environmental costs associated with the proposed restriction (GHG emissions). Here also, the DS was not able to quantify this additional cost

[30] https://www.cdr-copdl.fr/doc_num.php?explnum_id=17535

[31] https://www.unecto.fr/fr/content/2013/01/15/enjeux-9

but assumes the latter to be limited if end-of-life creosote-treated sleepers are incinerated with energy recovery. Such practices were reported by some of the MSCA and NRIMs surveyed during the elaboration of this dossier (i.e., Norway, Finland, and France); however the reprensentativeness of such practices in the EEA could not be assessed by the DS.

In addition, compared to RO1, RO2 poses a risk to professionals reusing creosote-treated wooden sleepers. Given the CMR properties of the substance, this induces an additional cost associated with the restriction in terms of human health. However, the DS was unable to assess this cost.

Economic impacts of RO1

The scope of RO1 corresponds to the scope of RO2 to which is added a restriction on the reuse of creosoted sleepers by the original users (i.e., NRIMs). The DS did not assess the economic impacts associated with this RO but the latter are discussed qualitatively here.

Given the small volumes of sleepers reused by the original users (between 16,000 and 46,000 sleepers/year), the additional costs induced by RO1 compared to RO2 are assumed by the DS to be limited and unlikely to affect these NRIMs and their activities significantly. This conclusion can be supported by the information provided to the DS regarding the alternatives that would be used by NRIMs under RO1 and the installation and maintenance costs of these market actors. Indeed, under RO1 NRIMs would replace reused creosoted sleepers with treated (creosote or copper hydroxide) wooden sleepers or composite sleepers. The use of concrete sleepers is unlikely given the railroads in which reuse takes place (see Annex B). In addition, NRIMs are likely to have higher unit installation and maintenance costs than private railroads, resulting in a lower cost per sleeper to be substituted than under RO2 (see Table 9).

However, in the French context, used sleepers available for reuse have been described as a relevant resource for sleepers' renewal on small local railway lines. The French network manager also considered that the RO1 could lead to a degradation of the quality of the transport service provided on these lines (e.g. reduction of the running speed) because of the higher renewal costs (hearing SNCF Réseau). However, the DS was not able to confirm and assess the representativeness of such an impact for the EEA.

Finally and similarly to RO2, RO1 is likely to induce additional environmental and human health costs depending on the considered alternative.

2.4. Comparison of the options proposed

In comparison with RO1, the DS believes that RO2 allows a relative comparable reduction of risk to human health and the environment especially if considering that reuse prohibition would lead to increase the use of primary creosote-treated wood put on the market. In other cases, RO1 would sharply and even totally decrease exposure of general public and of the environment. Indeed, prohibiting reuse by users other than the initial user in addition to secondary uses would avoid the "leakage" of these treated woods that could ultimately be the object of secondary uses under second-hand market.

However, when considering the circular economy issue and taking into account that reuse prohibition would lead to increase the use of creosote treated wood primary put on the market, RO2 appears more relevant in a global approach.

While comparing RO1 or RO2 with the actual situation (baseline), and based on data gathered (during audition, MSC consulations, telecommunication and NRIMs), reuse will be limited to railways sleepers which quality autorise it. The concerned volumes were estimated at between 26,000 to 56,000 sleepers per year. Secondary uses of creosote-treated wood have also been reported in the EEA, mainly involving timber primarily used as railway sleepers and transmission poles. No information on the specific secondary-uses associated with these volumes was provided to the Dossier Submitter. Contributions from the MSCA reported that secondary uses are implemented both by private individuals and professionals (see Annex B 2.3). Both restriction options propose to prohibit all secondary-use and second-hand market of creosote-treated wood to avoid secondary exposure of professional workers, general public and the environment.

Related to the transitional period, as there is already several limitations in placing on the market, reuses and secondary-uses of creosote-treated wood due to existing Annex XVII entry 31, and having in mind that this restriction is targeting uses of articles already covered for their primary use in BPR, no long transitional period is assumed to be necessary (alternatives are available – see Annex E.2. for more information on the matter). Therefore, it is assumed that 12 months would be sufficient after its entry into force.

These assessments are underpinned by information on uses, releases, availability of alternatives and socio-economic impacts and are resumed in Table 24.

Table 24: Considerations related to the restriction options investigated

Restriction Options		Risk considerations	Impact considerations	Considerations related to risk reduction capacity and proportionality
RO1	Restriction of placing on the market of creosote treated-wood not covered by the BPR, corresponding to all reuses, all secondary-use and all transfer (gracious or monetised) of all woods treated with creosote and creosote related compounds	• Risk to human health and environment by reuse and secondary uses fully addressed. • Risks to professionnal covered by BPR adressed. • Risks to human health and environment of first uses covered by BPR.	• Impacts to several industries such as impregnation, railways, telecommunications, agricultural, breeding. • Impacts on importers of treated articles. • Increase in hazardous waste generation that has to be properly managed	• Very efficient. Some decrease of the efficiency is possible in case BPC opinion allow national authorisation for specific uses in regards to monitorability of reuses, secondary-uses and proper end of life elimination. • Risk reduction: High as risk to the HH and the environment exist due to primary uses (not covered by REACh).

				• Proportionality is considered as medium to high. By prohibiting all reuse, it will bring additional costs and a potential increase in creosote and creosote-treated volumes produced under BPR. May favour innovation and transition to alternatives.
RO2	Restriction of placing on the market of creosote treated-wood not covered by the BPR, at the exception of railways sleepers and poles for the same use, under similar conditions and by the same original user. All transfer of treated wood (free of charge or against payment) shall not be allowed.	• Risk to general population addressed. Risks to professionnal covered by BPR adressed. Risks to human health and environment of first uses covered by BPR.	• Impacts on agricultural and breeding industries • Impacts on importers of treated articles. • Minor increase in hazardous waste generation that has to be properly managed	• Efficient as risks for general population are addressed. Likely to be less efficient for risks to the environment. • Risk reduction:Medium as risk to the HH and the environment still exists due to reuse of creosote-treated wood. • Proportionality: High to Very High as will allow reuse, limit costs due to transition to costlier alternatives and limit increase in volume of creosote and creosote treated wood used under BPR.

2.5. Proportionality of the restriction proposed

As discussed above, the additional costs incurred by NRIMs due to the proposed restriction can be considered as marginal (SNCF hearing) and this restriction is unlikely to affect these companies and their activities significantly (i.e. no impact on the quality or price of transport services). Besides, the risk of negative economic impact of the proposed restriction on private railway managers appears uncertain to the DS given the uncertainties in the parameters considered. However, according to the collected information and the assessed impacts, the DS considers the economic impacts of the restriction to be affordable if the substitution of reused sleepers is based on new creosoted wooden sleepers. Indeed, in most of the scenarios considered in its assessment and if the substitution is spread over time, the DS shows that the extra-costs of such a substitution can be considered as moderate (see Table 7).

It has to be noted that the possibility to substitute reused creosote-treated wooden sleepers with new creosote-treated wooden sleepers is contingent upon the issuance of an authorization for this substance under the BPR. The issuance of such an authorization is considered likely by the Dossier Submitter at the time of preparation of this dossier, therefore the DS considered this alternative.

If creosote use were not allowed under the BPR renewal process for creosote such a decision may lead to reconsider the reuse of creosote-treated sleepers and a dedicated assessment should be made. In that case, the DS considers RO1 as providing the best risk management provision by ensuring consistency of regulations and prohibiting second-hand market, secondary uses and reuse of creosote-treated wood already available in the market which authorisation were not granted anymore. Costs for this scenario were not assessed in this proposal. The qualitative assessment performed is applicable for this hypothetical outcome.

It should be noted that this conclusion is highly conditioned by the context in terms of availability of alternatives to wooden sleepers treated with creosote and their market price and does not constitute a recommendation formulated by the DS. The DS is well aware of the environmental (PBT, vPvB) and human health (CMR) properties of creosote.

If creosote use were not allowed under the BPR, **the DS considers that a substitution based on new wooden sleepers treated with copper hydroxide could result in affordable economic impacts (see Table 13).** A decrease in acquisition cost of new wooden sleepers treated with copper hydroxide is considered likely by the DS on the basis of the contributions gathered in the framework of the BPC consultation and the elaboration of this dossier. Indeed, oil-based copper hydroxide biocidal products are likely to be used by EU NRIMs within the coming years, which could lead to such a price decrease.

Moreover, according to the DS, the professionalization process underway in the tourist rail sector and the role of local authorities in financing these infrastructures (at least in the French context), contributes to the affordability of the additional cost. The risk of negative economic impacts on consumers could not be assessed by the DS. The DS also expects the public consultation to provide additional elements on these issues.

Finally, the proposed restriction is expected to bring overall benefits to society on several grounds as follows:

- Decrease in exposure of the human population and especially general public due to the prohibition of all second-hand market and secondary uses for creosote-treated wood. As solely reuse by the same actor would be authorised, it would normally increase risk mitigation measure set out in the BPC opinion on creosote authorisation renewal. Exposure of the general public which must be reduce to it's minimal as state in the RAR "creosote is carcinogenic and reprotoxic, therefore the secondary exposure of the general public should be minimised" will be decreased due to this prohibition;
- Decrease in exposure of the environment due to the prohibition of all second-hand market and secondary use for creosote-treated wood, avoiding exposure of the environment to PBT, vPvB at another location;
- Promote the uses of safer alternatives under BPR TP 8 to allow secondary uses of treated-wood;

- Decrease exposure of the environment due to the removal of the exceptionnal regime for wood treated before 31 december 2002 and reinforcement of information regarding the handling of these treated articles at the end of their lifetime as an hazardous waste. Proper elimination of articles containing CMR is energy recovery through incineration. This has to be promoted as it was observed that there was some proposals to manage these hazardous waste by burrying them[32] which will led to higher exposure of the environment;
- Ensure proper articulation between BPR and REACH and acertain that authorised substances, products containing the substances and treated articles authorised under BPR are covered from first placing on the market to proper hazardous waste disposal.
- Respect the principle set out in the WFD and restated in the circular economy plan, one of the main building blocks of the European Green Deal agenda for sustainable growth[33]

Regarding risk reduction of the proposed restriction, the DS was not able to quantify the environmental and human health benefits of the proposed restriction. The proposed restriction covers the management of articles treated with biocidal product authorised under BPR and already placed on the market in the meaning of REACH. By solely managing already treated articles, the proposed restriction options will only lead to partly decrease the identified risks for the corresponding (re)uses.

Exposure of professionnal will remain and exposure of the environment will occur through service-life of creosote-treated wood. The risk reduction will mainly arise from the prohibition of second-hand market and secondary uses for creosote-treated wood by decreasing exposure of professionnal and non-professionnal operating in the removal of old treated-wood. It would also allow to avoid at a maximum extent the exposition of general population. Even when considering the most restrictive option, RO1 which prohibits all reuse and second-hand market and secondary uses of treated wood, the exposition linked to authorisation of the substance, products containing the substance and uses under BPR will remain and potentially even increase if freshly creosote-treated wood is the preferred alternative to old creosote-treated wood. In that sens, RO2 global impact is favored.

Moreover, depending on the alternatives highlighted by the BPC opinion and potentially authorised under BPR (chemical alternatives for PT 8) and considered in this proposal, creosote-treated wood appeared as the best economically viable alternatives to old creosote-treated wood under ongoing regulations and market conditions. If the renewal of creosote authorisation as a biocidal product is not granted, copper hydroxide (water or organic based) appeared as the best alternative and affordable substance for substitution of creosote in treating wood application, but the benefits for human health and environment were not assessed in this dossier. Indeed, the objective of the restriction proposal was the management of treated articles authorised under BPR available for reuse and in the second hand market (reuse and secondary uses) and to comply with safeguard clause obligations that triggered this proposal. Moreover, concrete material is also a valuable alternative as already widely used for telecommunication poles and sleepers. However, the installation of concrete sleepers would require modification of the track superstructure. This would generate significant

[32] https://www.cdr-copdl.fr/doc_num.php?explnum_id=17535

[33] https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en

construction costs (ballast lifting, rail changes). Given the market actors and infrastructures targeted by the proposed restriction, concrete sleepers are not considered to be a relevant alternative from an economic perspective by the Dossier Submitter. NRIMs surveyed during the elaboration of this dossier confirmed tis assumption by pointing out that only alternatives based on treated wood were relevant under the proposed restriction.

Therefore, overall the Dossier Submitter concludes that the proposed restriction is affordable and proportionate.

2.6. Practicality and monitoriability of the restriction proposed

2.6.1. Practicability

Practicability is assessed in terms of implementabilty, enforceability and manageability. The proposed restriction is considered practical since it is implementable, manageable and enforceable. The difference between RO1 and RO2 is the level of reuse allowed for already treated wood firstly authorised under BPR. In either case the restriction is easily understandable for affected parties which are all managers of network involving creosote-treated wood (railways, telecommunications and energy suppliers, wood impregnators, eventually breeders and farmers).

The proposed restriction is practical because it would have no economic and market impact on creosote suppliers as a biocidal product for treating wood and would have no impact on freshly creosote-treated wood articles. This restriction is implementable, enforceable and manageable as the proposed restriction is easy to understand and communicate down the supply chain and can be enforced. The communication in regards to risks could easily be increased if a labelling is developed under BPR for creosote-treated wood. A difficulty in ensuring the entire and proper disposal under requirement of WFD (2008/98/EC) for wood treated before 31 December 2002 was noticed.

2.6.1.1. Implementability

Implementability implies that the actors involved are capable in practice to comply with the RO. To achieve this, the necessary technology, techniques and alternatives should be available and economically feasible within the timeframe set in the RO.

The restriction is implementable as alternative to creosote as a biocidal product for wood protection are already authorised under BPR. Moreover, non-chemical alternatives are also available in the market. Last, it is still possible for the railway managers, private owners, collectivity and associations managing railways tracks to use new creosote treated-wood instead of old sleepers. Moreover, secondary uses of creosote-treated wood are already partly restricted under ongoing Annex XVII entry 31. In addition, the proposed restriction gives sufficient time to the impacted supply chains to transition. Finally, the proposed option allows reuse of sleepers under identical conditions.

RO2 is therefore considered as implementable.

2.6.1.2. Enforceability

Enforceability means that the authorities responsible for enforcement need to be able to check the compliance of relevant actors with the RO. The resources needed for enforcement have to be proportional to the avoided risks.

Enforcement authorities can set up efficient supervision mechanisms to monitor industry's compliance with the proposed restriction. It is possible to follow the volumes of wood which are buy and cease by an economic actor to properly estimate the reuses volumes and the volumes which are considered as waste and has to be eliminated. The implementation of a labelling to creosote-treated wood is a simple solution to follow these articles all along their service life and would ensure a proper follow up especially at their end of life. As detailed previously, this labelling can be a physical one such as an engraving steel plate, a bar code, a QR code or can be a more technological one, such as a NFC or RFID chip.

2.6.1.3. Manageability

Manageability supposes that the RO should take into account the characteristics of the sectors concerned be understandable to affected parties. The means of its implementation should be clear to the actors involved and the enforcement authorities and access to the relevant information should be easy. Furthermore, the level of administrative burden for the actors concerned and for authorities should be proportional to the risk avoided.

The restriction is easily understandable for affected parties which are all managers of network involving creosote-treated wood (railways, telecommunications and energy suppliers, wood impregnators, eventually breeders and farmers) and authorities. One of the aim is also a simplification and clarification of the role of the two regulations involved in this proposal. Therefore, the level of administrative burden is not expected to be higher than nowadays but smoother.

2.6.2. Monitorability

The implementation of the proposed restriction options can be monitored via surveillance programs of national enforcement bodies and existing reporting systems. Information on market trends as regards to the uses of alternatives in wood treatment may provide valuable additional information on the regulatory effectiveness of the restriction. A difficulty in ensuring the entire and proper disposal under requirement of WFD (2008/98/EC) for wood treated before 31 December 2002 was noticed.

In addition, the following could assist with the monitoring of the impact of the proposed restriction measure and the assessment of necessary further measures:

- the introduction under BPR by national authorities of a specific labelling for creosote-treated wood allowing a better follow up of the treated-articles all along their service life, EU-harmonised codes to enable tracking of articles. This labelling can be a physical one such as an engraving steel plate, a bar code, a QR code or can be a more technological one, such as a NFC or RFID chip.

3. Conclusion

Creosote is a substance not registered under REACH and is used exclusively in Europe as a biocidal substance in "wood preservatives" products (Product Type 8, according to BPR

product classification). The approval of creosote as a biocidal substance, the authorisation of biocidal products containing the substance and of the use of creosote-treated wood is in the remit of the BPR, and is currently under a reassessment process. Furthermore, an overlap of both BPR and REACH provisions is noted in regards to the management of creosote and creosote treated-wood articles.

Indeed, creosote and eight other creosote-related substances are included in REACH Annex XVII entry number 31 which regulates the conditions for their use in wood treatment and the first placing on the market of treated-wood.

In regards to the entry 31 of Annex XVII, the conclusion of the Dossier Submitter's assessment is to propose a restriction covering second-hand market, reuse and secondary uses of creosote treated-wood authorised under BPR to prevent any existing or future non authorised uses of creosote treated-wood regulated under REACH which would pose a risk to professional workers, the general public in terms of human health and the environment as clearly demonstrated by the RAR and the BPC Opinion on the renewal of authorisation of creosote as a biocidal substance.

The eight other creosote-related substances currently listed in the current entry 31 are not authorised for biocidal use under BPR and wood-treated with such substances shall not be placed on the market. Consideration of reuses and secondary uses of a primary use that does not exist do not seem relevant. However, because wood–treated in the past with these substances may already be in use, they are kept in the scope of the entry 31 to restrict their second-hand market, reuses and secondary-uses in a similar way to creosote.

Two ROs were assessed on the basis of the effectiveness, practicality and monitorability of these ROs and the following restriction updating the current entry 31 of Annex XVII is proposed to ensure a better regulatory framework articulation for managing creosote and substances covered by the current entry 31 as follows:

Table 25: Proposed restriction and evolution of entry 31 Annex XVII of REACH

Substances	Conditions of the restriction
(a) Creosote; wash oil CAS No 8001-58-9 EC No 232-287-5 (b) Creosote oil; wash oil CAS No 61789-28-4 EC No 263-047-8 (c) Distillates (coal tar), naphthalene oils; naphthalene oil CAS No 84650-04-4 EC No 283-484-8 (d) Creosote oil, acenaphthene fraction; wash oil CAS No 90640-84-9 EC No 283-484-8 EC No 292-605-3 (e) Distillates (coal tar), upper; heavy anthracene oil CAS No 65996-91-0	1. Wood treated with such substances shall be placed on the market in the conditions and derogations defined by the BPR. 2. Wood treated with such substances and placed on the market in accordance with paragraph 1: a. shall not be reused or subject to secondary use; b. shall not be placed on the second-hand market. 3. By way of derogation to paragraph 2.a, wood treated with such substances can be reused for the same use, under similar conditions and by the same original user. 4. Once considered as waste, treated wood referred to under paragraphs 1 and 3 should be handled as hazardous waste according to the waste directive framework 2006/12/EC (Art. 17).

EC No 266-026-1 (f) Anthracene oil CAS No 90640-80-5 EC No 292-602-7 (g) Tar acids, coal, crude; crude phenols CAS No 65996-85-2 EC No 266-019-3 (h) Creosote, wood CAS No 8021-39-4 EC No 232-419-1 (i) Low temperature tar oil, alkaline; extract residues (coal), low temperature coal tar alkaline CAS No 122384-78-5 EC No 310-191-5	5. The restriction shall apply 12 months after its entry into force

As resulting from data gathering, reuse is a practise only for railway sleepers. In order to decrease to a maximum extent the exposure of human health and the environment as non-tolerable risks were demonstrated, and based on data available during the preparation of this proposal, the DS proposes to prohibit all secondary-uses of creosote-treated wood and second-hand market. Most secondary uses by the general public were already covered by the current version of entry 31. This proposed restriction is intended to extend the current restriction to all treated wood including those treated prior to 2002. The DS did not assess the socio-economic impact of the proposed restriction for second-hand market and secondary uses due to lack of data but also because it is considered marginal given the small difference in terms of scope between the current restriction and this proposal. Moreover, the recent BPC opinion underlined that such uses by the general public should be avoided due to the presence of carcinogens. In regard to railway sleepers, the additional costs triggered by the proposed restriction were estimated to be considered as affordable.

However, the negligible negative economic impact of the proposed restriction on private railway managers was estimated as uncertain. The DS considers the economic impacts of the restriction to be affordable if the substitution of reused sleepers is based on new creosoted wooden sleepers. The possibility to substitute reused creosote-treated wooden sleepers with new creosote-treated wooden sleepers is contingent upon the issuance of the renewal of the approval for this substance under the BPR which is considered likely by the Dossier Submitter at the time of preparation of this dossier. Therefore the DS considered this alternative.

If creosote use were not allowed anymore under the ongoing BPR renewal process for creosote such a decision may lead to reconsider the reuse of creosote-treated sleepers and a dedicated assessment should be made. In that case, the DS considers RO1 as providing the best risk management provision by ensuring consistency of regulations and prohibiting second-hand market, secondary uses and reuse of creosote-treated wood already available in the market for which authorisation would non be granted anymore. The DS considers that a substitution based on new wooden sleepers treated with copper hydroxide could result in affordable economic impacts. Moreover, copper hydroxide also presents a more favourable hazard profile than

creosote, but an entire risk assessment need to be performed under BPR in the case of full substitution of creosote with these chemicals (copper hydroxide water or oil based).

Given the competence of REACH compared to BPR, this proposed restriction will not substantially reduce the risks identified in relation to the use of creosote and creosote-treated wood. However, the prohibition of all secondary uses will significantly reduce the risk induced by the uses of creosote-treated wood covered by REACH (i.e., second-hand market, reuse and secondary uses only), in particular by reducing the exposure of non-trained professionels, the general public and the environment. Moreover, should national derogations for some uses of creosote-treated wood be allowed under BPR, restriction of reuses to the same use, under similar conditions and by the same original user as proposed (RO2) is consider as ensuring consistency of regulations and to limit the substitution by new wooden sleepers compared to a total ban as proposed in RO1.

Additionnally, the proposed restriction would allow to simplify the ongoing entry 31 by focusing on what is truly covered by REACH. The preconisation regarding biocidal products and treated articles labelling and uses were the remit of the BPR and has to be treated under this regulation. By conserving all the substance covered by the ongoing entry 31 in this proposal, it will ensure that wood treated in the past is still covered by the restriction. The status of creosote-treated wood as hazardous waste is stated again and the restriction clearly stipulates that, articles reaching the end of their service lifeneed to be disposed accordingly. Related to the transitional period, as there is already several limitations in placing on the market, reuses and secondary-uses of creosote-treated wood due to existing Annex XVII entry 31, and having in mind that this restriction is targeting uses of articles already covered for their primary use in BPR, no long transitional period is assumed to be necessary (alternatives are available – see Annex E.2. for more information on the matter). Therefore, it is assumed that 12 months would be sufficient after its entry into force.

Annexes

Annex A: Identity of the substance(s) and physical and chemical properties

Table A- 1: physico-chemical properties of creosote

Melting point (state purity)	Crystallization temperature: 0°C and 30°C (grade B and grade C respectively)
Boiling point (state purity)	Range: ≥ 210 °C – 400 °C (grade B) ≥ 260-400°C (grade C)
Thermal stability / Temperature of decomposition	> 400°C
Appearance (state purity)	Brown liquid with aromatic phenolic odour (purity not applicable)
Relative density (state purity)	1.08 – 1.10 (Grade B and Grade C)
Surface tension (state temperature and concentration of the test solution)	Not possible to determine for a complex mixture with a low solubility in water.
Vapour pressure (in Pa, state temperature)	Measurements in the range 164-255°C (Grade B) and 180-285°C (grade C). Extrapolated: 20 °C 0.4 Pa (Grade B) 0.3 Pa (Grade C) 25 °C 0.66 Pa (Grade B) 0.50 Pa (Grade C) 50 °C 4.88 Pa (Grade B) 3.41 (Grade C) 100 °C 120 Pa (Grade B) 72.6 Pa (Grade C)
Henry's law constant (Pa m^3 mol^{-1})	Not possible to determine for the complex creosote mixture Range for single components (literature data for 18 PAHs): 0.007 (6 ring PAH) – about 150 (acenaphthylene) Pa*m^3/mol
Solubility in water (g/l or mg/l, state temperature)	For creosote expressed as TOC: At a loading of 100 mg creosote/l water:

	2.25-8.11 mg/l (Grade B, Grade B-composite and Grade C) At a loading of 10 g creosote/l water: 191 mg/l (Grade B-composite) 30.3 mg/l (Grade B) 27.7 mg/l (Grade C) Range for single components (literature data for 18 PAHs): 0.26 µg/l (benzo[ghi]perylene) – 31.7 mg/l (naphthalene) Higher solubilities anticipated for the polar components (i.e. phenolics, N-, S- and O-heterocycles)
Solubility in organic solvents (in g/l or mg/l, state temperature)	Completely miscible in benzene or toluene, >99.5 % in acetone, soluble in quinoline
Stability in organic solvents used in biocidal products including relevant breakdown products	Not relevant as creosote is not used in any solvents
Partition coefficient (log P_{OW}) (state temperature)	Experimentally determined for US types creosote P1/13 and P2: 2.7 (o:w 8:1)-3.7 (o:w 1:1.25) o:w = octanol to water ratio
Dissociation constant	Not possible to determine for the complex creosote mixture Creosote is not anticipated to be significantly affected by pH, as the great majority of the components cannot dissociate.
UV/VIS absorption (max.) (if absorption > 290 nm state ε at wavelength)	No specific information due to complex mixture of aromatic compounds
Flammability or flash point	Flash point: >87 – >120 °C (Grade B and Grade C)
Explosives/ explosive properties	Not explosive
Flammable liquids	Creosote is a liquid with a flash point of > 80 °C, therefore it is not classified as flammable liquid
Self-reactive substances and mixtures	Not applicable, no chemical groups present in creosote are associated with self-reactive properties
Pyrophoric liquids	Not applicable, creosote does not fall under the definition of pyrophoric liquids
Oxidising liquids	Not applicable, due to technical origin and chemical structure creosote is not oxidising

Organic peroxides	Not applicable, creosote does not fall under the definition of organic peroxides
Corrosive to metals	Not applicable, experience in use shows that creosote is not corrosive to metal
Auto-ignition temperature (liquids and gases)/ Auto-ignition or relative self-ignition temperature	≥450 °C (Grade B and C)

Annex B: Manufacture and uses

B.1. Manufacture, import and export of creosote

The geographical boundaries for the assessment are the countries of EEA. To our knowledge, there are currently 42 creosote impregnation plants in the EEA. Nowadays, 1 to 6,000,000 m3 are impregnated in the EEA in 42 impregnation plants, among which 1,000,000 m3 are impregnated with creosote each year in the EEA (WEI-IEO, 2016[34], Lonza[35]) for fencing, tree stakes support, utility poles (mainly telecommunications) and sleepers (200 000 to 400 000 m3 (Lonza, UIC, 2013[36])). Around 750 000 creosoted poles are produced and used in Europe annually. According to WEI-IEO, the annual volume of creosote used in the EEA is 80 000 tpa, with an additional 40 000 tpa for export outside EEA. The repartition of these volumes are:

Table B- 1: Annual use of creosote within EEA

Use	Approximative volume of creosote used within EEA	
	%	Tpa
Fencing	± 25%	20,000
Tree stakes	± 10%	8,000
Utility poles	± 20%	16,000
Sleepers	± 45%	36,000
Total	100%	80,000

These data were pre-Brexit data and the actual volume may be different. (SEA-SM1, WEI-IEO 2016).

[34] https://www.wei-ieo.eu/wp-content/uploads/2019/02/SEA-SM1_2016_FullReport.pdf

[35] https://energiforskmedia.blob.core.windows.net/media/24602/tanasote-a-modern-twist-on-an-old-classic-ebook.pdf

[36] SUWOS (Sustainable wooden railway sleepers) study, UIC, january 2013

B.2. Uses: general overview[1]

B.2.1. Primary uses of creosote-based treated wood

At the EU-scale, creosote-based treatment products have been approved[37] and can be used by professionals for preventive treatment of wood according to the following use classes[38] and for the following uses:

Table B- 2: Approved uses of wood treated with creosote-based products and corresponding use classes

Use	Use classes (UC)*
Wood to be used as railway sleepers	UC3, UC 4
Wood to be used as wood poles for overhead electricity and telecommunication	UC4
Wood to be used as agricultural fencing	UC3, UC 4
Wood to be used as equestrian fencing	UC3, UC 4
Wood to be used as industrial and highways fencing	UC3, UC 4
Wood to be used as cladding for non-residential buildings	UC3, UC 4
Wood to be used as tree support post	UC 4
Wood to be used for marine installations	UC 5

*The European Standard EN 335 dedicated to durability of wood and wood-based products defines five use classes (UC) that represent different service situations to which wood and wood-based products can be exposed:

- UC 3 is for end uses where wood is used outdoors not in contact with the ground;
- UC 4 is for end uses where wood is in contact with or very close to the ground and frequently wet;
- UC 5 is for outdoor uses with regular or constant contact with the ground or water.

[37] The use of creosote as a biocidal product has been authorized through the Commission Directive 2011/71/EU of 26 July 2011. This authorization came into force on May, 1st 2013 for an initial period of five years and has been extended until 31/10/2021. The renewal of the approval is currently in progress under the framework of BPR.

[38] Consideration of Risks for Use Classes Seeking Approval – as defined in the RAR compiled by the former evaluating competent authority (UK).

Table B- 3: Summary of use classes and relevant attacking biological agents (reproduction from BS EN 335:2013)

Use class	General use situation [a]	Occurrence of biological agents [b, c]				
		Disfiguring fungi	Wood-destroying fungi	Beetles	Termites	Marine borers
1	Interior, dry	-	-	U	L	-
2	Interior, or under cover, not exposed to the weather. Possibility of water condensation	U	U	U	L	-
3	Exterior, above ground, exposed to the weather. When sub-divided: **3.1** limited wetting conditions **3.2** prolonged wetting conditions	U	U	U	L	-
4	Exterior in ground contact and/or fresh water	U	U	U	L	-
5	Permanently or regularly submerged in salt water	U[d]	U[d]	U[d]	L[d]	U

U = ubiquitous in Europe and EU territories
L = locally present in Europe and EU territories

[a] Border line and extreme cases of use of wood and wood-based products exist. This can cause the assignment of a use class that differs from that defined in this standard (see Annex B).

[b] It may not be necessary to protect against all biological agents listed as they may not be present or economically significant in all service conditions in all geographic regions, or may not be able to attack some wood-based products due to the specific constitution of the product.

[c] See Annex C.

[d] The above water portion of certain components can be exposed to all of the above biological agents.

Protection of wood corresponding to UC 3, UC 4 and UC 5 can be obtained through pressure impregnation. For UC 3 and UC 4 wood, surface treatments can also be implemented on wood being already impregnated after modifications such as sawing, cutting, shaping and machining. Surface treatment only applies where there has been machining of pressure treated wood after treatment (normally all machining to be done before treatment). Hot and cold impregnation can also be implemented as preventive treatment of wood to be used as tree support posts, posts/stakes for agricultural fencing, posts/stakes for equestrian fencing and allows to obtain protection of wood corresponding to UC 4.

Marketing authorizations for creosote-based biocidal products are issued at national level. Thus, the uses for creosote treated wood products may differ from one Member State to another. Table B- 4 summarizes authorized uses for each the Member States of the EEA.

Table B- 4: Marketing authorizations and uses for creosote-based biocidal products issued at national level in the EEA

Member states	1) Treatment of wood to be used as railway sleepers	2) Treatment of wood to be used as transmission poles (electricity, telecommunication)	3) Treatment of wood to be used as tree support poles in orchards and vineyards or other agricultural stakes	4) Treatment of wood to be used for fences (agricultural fencing, e.g. for horse stables and other fences)	5) Treatment of wood to be used in harbours and waterways	6) Other
Belgium	YES	NO	YES	YES	NO	-
Bulgaria	-	-	-	-	-	-
Czech Republic	YES	YES	-	YES	NO	-
Denmark	NO	NO	NO	NO	NO	-
Germany	YES	NO	NO	NO	NO	-
Estonia	YES	YES	NO	NO	-	-
Ireland	YES	YES	NO	YES	YES	YES (external cladding on non-residential buildings)
Greece	NO	YES	NO	NO	NO	-
Spain	YES	YES	NO	NO	NO	-
France	YES	NO (from 2022)	NO	NO	NO	-
Croatia	YES	NO	NO	NO	NO	-
Italy	-	-	-	-	-	-
Cyprus	-	-	-	-	-	-
Latvia	YES	YES	NO	NO	NO	-
Lithuania	NO	NO		NO	NO	-
Luxembourg	-	-	-	-	-	-
Hungary	YES	YES		NO	NO	-
Malta	-	-	-	-	-	-
Netherlands	NO	NO	NO	NO	NO	-
Austria	YES	YES	YES (for some uses)	NO	NO	-
Poland	YES	YES	YES	YES	NO	-
Portugal	YES	NO	NO	NO	NO	-
Romania	-	-	-	-	-	-
Slovenia	YES	NO		NO	NO	-
Slovakia		-	-	-	-	-

Finland	YES	YES		YES	NO	YES (Bridges)
Sweden	YES	YES	NO	NO	NO	-
Iceland	-	-	-	-	-	-
Liechtenstein	-	-	-	-	-	-
Norway	YES	YES	NO	NO (export only)	YES	YES (Bridges)
Switzerland	YES	NO	NO	NO	NO	-

Key: "-" - No information ; Sources: Results of the survey conducted among MSCA as part of the elaboration of this restriction dossier, results of the public consultation conducted as part of the evaluation of applications for renewal of approval of creosote-base substances under the BPR, BPR renewal assessment report. Authorizations at the date 9th December 2021. For more details, please refer to https://echa.europa.eu/fr/information-on-chemicals/biocidal-active-substances/-/disas/factsheet/19/PT08 and https://ec.europa.eu/health/biocides/creosote_en

B.2.2. Reuse of creosote-based treated wood

As a reminder, reuse of wood treated with creosote or creosote-based products means any operation by which this treated wood is used again for the same purpose for which it was primarily conceived (article 3-13 of Directive 2008/98/EC; e.g., reuse of railway sleepers uninstalled during maintenance operations).

From a practical perspective, wood treated with creosote can be reused if the condition of the material allows it. Such reuse practices can be implemented by the original user or by another user having benefited from the sale or donation of the used timber. Such reuse practices are mostly observed for railway sleepers (MSCA consultation and hearings; CGEDD, 2017). It appears that the reuse of timber treated with creosote primarily used for transmission poles, fencing, as tree support poles and in harbors and waterways is very limited due to the poor condition of the material at the end of service-life. However, the reuse of transmission poles has been reported in Southern Europe (Greece and Spain). Associated reused volumes seem to be of limited extent but no quantitative data is available. Reported practices also reveal that the timber is retreated before reinstallation. Consequently and to the Dossier Submitter's understanding such practices do not correspond to reuse and fall under the remit of the BPR. On the basis of the latter consideration, combined with the lack of quantitative data and the marginal "reuse" extent of transmission poles, only the reuse of railway sleepers will be further documented in the remainder of this restriction dossier.

Table B- 5 reports on the EEA Member States for which reuse practices have been reported, as well as the type of reuse observed (i.e., reuse by the original user or other users). Given the marginal reuse extent of transmission poles, only the reuse of railway sleepers will be further documented in the remainder of this restriction dossier.

B.2.3. Secondary use of creosote-based treated wood

As a reminder, secondary use corresponds in the present case to the use of wood treated with creosote or creosote-based products for different uses than their primary use when coming to their end of service-life (e.g. collection and use of treated wood as vegetable garden fences by private individuals).

Secondary uses of creosote-treated wood have also been reported in the EEA (MSCA consultation and hearings; CGEDD, 2017). These secondary uses seem to mainly involve timber primarily used as railway sleepers and transmission poles (see Table B - 6). Contributions submitted as part as the consultation of MSCA and national infrastructure managers identified that some secondary uses prohibited under REACH Annex XVII, entry 31 (§ 3) still remain at present, although some MS highlighted the decline in these practices following the entry into force of this current restriction. Other MS report the existence of formalized official networks for certain secondary uses authorized under the current REACH restriction (Italy, Belgium)[39]. Companies in Belgium and in the Netherlands are also involved

[39] E.g., "In the Flemish region, a limited number of companies are specialized in trading of used creosoted railway sleepers. Used sleepers are mainly bought from national railway companies, or imported from the Netherlands. The

in imports and exports networks of second-hand creosoted railway sleepers. However information on the quantity of second-hand creosoted railway sleepers traded in these countries for secondary-use is fragmented at best.[40] No information on the specific secondary-uses associated with these volumes was provided to the Dossier Submitter. There is also no information indicating that these practices and volumes may be representative of practices of other EEA countries. Large volumes of used creosoted railway sleepers are reportedly exported from Belgium to the United Kingdom, which is a major market for second-hand creosote-treated wood used for landscaping and fencing.

Contributions from the MSCA reported that secondary uses are implemented both by private individuals and professionals for the following uses:

- Landscaping : outdoor stairways or sidewalks, flower bed enclosure, support for walkways in marshes, support for walkways;
- Agricultural fencing: agricultural fences and enclosures for cattle, horses or other animals;
- Support poles - agriculture : support poles for nets to protect crops/cultures from hailstorm;
- Garden fencing : raised bed construction;
- Cladding and construction: Outer and inner walls and fronts of houses and carports;
- Piers and parts of docks that tend to come into contact with seawater;
- Environmental engineering: terrain containment, avalanche protection systems.

The SUWOS report (UIC, 2013) mentions that creosoted wooden sleepers could be sold to professional users for reuse as fences or in other constructions (approx. 20,000 sleepers sold for reuse in 2010[41]) but stresses that these practices are fading out.

Table B- 6 reports EEA Member States for which secondary use practices have been reported, the type of secondary uses, the associated users as well as the type of creosote-treated wood used and supply networks. Given the limited data available (especially quantitative), secondary uses will not be further documented in the remainder of this restriction dossier.

receiving companies resell the sleepers on the local market for applications which are allowed under REACh Annex XVII, 31, §3."

[40] "There is only fragmented information on the amounts of railway sleepers that are traded in the Flemish region. Most of the sleepers from the Netherlands are imported under notification procedure cf. Reg. 1013/2006 (Basel code AC170). In 2020 the import of approx. 29,000 tons for secondary reuse purposes has been approved." "The Netherlands has no overview of the suppliers. There is no registry of the volume of creosoted wood that is sold for re-use or secondary use."

[41] Survey covering 60% of European track.

Table B- 5: Reuse of wooden railway sleepers treated with creosote in EEA Member States

Member states	Belgium	Bulgaria	Czech Republic	Denmark	Germany	Ireland	Estonia	Greece	Spain	France	Croatia	Italy	Cyprus	Latvia	Lithuania	Luxembourg	Hungary	Malta	Netherlands	Austria	Poland	Portugal	Romania	Slovenia	Slovakia	Finland	Sweden	Iceland	Liechtenstein	Norway	Switzerland
Reuse	N	-	Y*	N	Y*	N	-	N	N	Y	-	-	N	-	N	-	-	-	N	-	N	-	-	-	-	Y	-	-	-	Y*	-
Type of reuse	Na	-	-	Na	-	Na	-	Na	Na	S	-	-	Na	-	Na	-	-	-	Na	-	Na	-	-	-	-	S, O	-	-	-	S	-

Key: "Y" – implementation of reuse practices reported, "Y*" – reuse practices reported or assumed to be of limited extent, "N" - no reuse practices reported[42], "S" – reuse by the original user, "O" – reuse by another user than the original user, "Na" – not applicable, "-" – No information ; Sources: Results of the survey conducted among MSCAs and national railway infrastructure managers as part of the elaboration of this restriction dossier, results of the public consultation conducted as part of the evaluation of applications for renewal of approval of creosote-base substances under the BPR, BPR renewal assessment report.

[42] The DS assumed that no reuse of wooden railways sleepers treated with creosote takes place in MS in which primary use does not take place (i.e., use of creosote-based biocidal products for the treatment of wood to be used as railway sleepers, cf. Table A - 4).

Table B- 6: Secondary use of timber treated with creosote in EEA Member States

Member states	Secondary use of timber treated with creosote	Users	Secondary uses	Type of creosote-treated timber products	Supply networks / sources	Transfer mode of creosote-treated timber products
Belgium[d]	Y (Flanders)	Private individuals, professionals	Landscaping Fencing	RS	Supply : Mainly bought from national railway companies, or imported from the Netherlands Sale : unofficial online market places/classified ads Export to the UK	S
Bulgaria	-	-	-	-	-	-
Czech Republic	Y	Private individuals	Landscaping Fencing Cladding and construction	RS	-	-
Denmark[c]	Y*	Private individuals, professionals	Landscaping Agricultural fencing Cladding and construction Piers and docks	RS	Sale : unofficial online market places/classified ads	F,S
Germany[c]	Y*	Private individuals, professionals	Landscaping Agricultural and garden fencing Cladding and construction	RS, TP	-	-
Estonia	N	Na	Na	Na	Na	Na
Ireland	-	-	-	-	-	-
Greece[d]	Y	-		TP	-	S
Spain	Y	Professionals	Agricultural fencing Support poles (agriculture)	TP	-	-

France[a]	Y*	Private individuals, professionals	Landscaping Agricultural and garden fencing	RS	Sale : Unofficial online market places/classified ads	-
Croatia						
Italy[b,d]	Y	Professionals	Agricultural fencing (mainly) Support poles - agriculture Landscaping, Environmental engineering	TP	Sale : Primary user	S
Cyprus	N	Na	Na	Na	Na	Na
Latvia	-	-	-	-	-	-
Lithuania	-	-	-	-	-	-
Luxembourg	-	-	-	-	-	-
Hungary	-	-	-	-	-	-
Malta	-	-	-	-	-	-
Netherlands[c]	Y	-	-	RS	Sale : Unofficial online market places/classified ads	-
Austria	-	-	-	-	-	-
Poland	N					
Portugal	-	-	-	-	-	-
Romania	-	-	-	-	-	-
Slovenia	-	-	-	-	-	-
Slovakia	-	-	-	-	-	-
Finland	N	Na	Na	Na	Na	Na
Sweden	-	-	-	-	-	-
Iceland	-	-	-	-	-	-
Liechtenstein	-	-	-	-	-	-
Norway	Y*	Private individuals, professionals	Landscaping Fencing Waterways Support for walkways	RS, TP	Imports and exports Donation : Primary user, Sale : Unofficial online market places/classified ads	F, S
Switzerland	-	-	-	-	-	-

a: A national decree forbids the secondary use of any type of timber treated with creosote in France since 2018 (Decree of December 18, 2018 relating to the restriction of use and marketing of certain treated wood) however some secondary uses still remain at present. No information is available on the corresponding volumes ; **b**: No information regarding the secondary use of railway sleepers could be obtained for this MS but the implementation of such practices cannot

be excluded ; **c**: Only the types of creosote-treated wood for which secondary uses have been reported with a high level of confidence are listed here. The Netherlands, Germany, and Denmark reported that secondary use of other types of creosote-treated wood may occur; **d**: Contributions underlined that the secondary uses taking place in the country are allowed under the restrictions of REACH Annex XVII, 31, § 3.

Key: "Y" – implementation of secondary use practices reported, "Y*" – secondary-uses reported to be of limited extent or declining, "N" - no secondary-uses reported, "TP" – transmission poles, "RS" – railway sleepers, "F" – given in for free, "S" – Sold , "Na" – not applicable, "-" – No information ; Sources: Results of the survey conducted among MSCA and national railway infrastructure managers as part of the elaboration of this restriction dossier, results of the public consultation conducted as part of the evaluation of applications for renewal of approval of creosote-base substances under the BPR, BPR renewal assessment report.

B.3. Use, reuse and secondary use of wooden railways sleepers treated with creosote

B.3.1. Primary use

Sleepers are essential components of railways. Their role is to maintain the rails at the normal gauge and to transmit the load that the rails receive from the axles to the ballast or more generally to the underlying support. Figure B - 1 details the elements of a railway track system. The sleepers are used on the running tracks but also at turnouts, crossings and switches that allow the interruption and the communication between tracks.

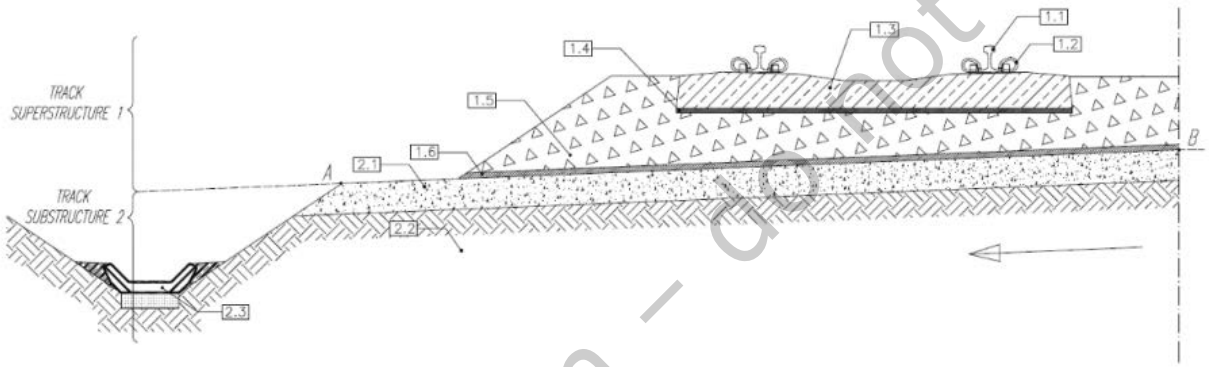

Figure B - 1: Components of a ballasted track system (from Zbiciak et al., 2017)

Key : Track superstructure (1): 1.1 – Vignole rail profile, 1.2 – rail fastening system (type SB or W14), 1.3 – rail sleeper, 1.4 – (option) under sleeper pad, 1.5 - ballast, 1.6 – (option) under-ballast mat. Track substructure (2): 2.1 – blanket layer, 2.2 – subgrade, 2.3 – surface drainage.

Wooden sleepers have been considered for more than a century as the most suitable for these functions. For a few decades, several alternatives have been developed and implemented within European railway networks. In particular, the use of concrete sleepers, which represent the most effective alternative to treated wood, has rapidly grown in Europe in the last decade. In the EEA, the use of wooden sleepers is still observed on high-traffic lines (see Figure B - 2), but these lines are progressively being regenerated with the installation of concrete sleepers which are now the most common type of sleeper used for new or overhauled railway lines (UIC, 2013). **However, overall, wooden sleepers are still widely used principally for technical but also for economic reasons.** Indeed, contrary to high traffic lines, the replacing of wooden sleepers by concrete sleepers is not relevant from an economic perspective for the following types of lines (CGEDD, 2017; UIC, 2013):

- **Low traffic lines**[43] (passenger and freight transport) are today mostly equipped with wooden sleepers. The sleepers installed on these tracks display a long service-life due to low traffic, their replacing is thus required only by units or small batches according to the ageing of the material, which prevents the use of concrete sleepers. The CGEDD Report (CGEDD, 2017) indeed underlines that the marginal replacing of wooden sleepers by concrete sleepers leading to so-called "mixed floors" (heterogeneous combination of wooden and concrete sleepers) is not technically possible, as these "mixed-floors" present a premature deterioration and high maintenance costs. The replacing of wooden sleepers by concrete sleepers must therefore be done by homogeneous zones (entire sections of track) during regeneration operations where the rails, sleepers and ballast are changed at the end of their service-life. Such operations, whose cost is very significant (around one million euros per km of network), are only considered on for high-traffic lines (CGEDD, 2017). Some sections of these low-traffic lines are also characterized by low ballast thickness and/or specific rail structures, which would increase the cost of replacing wooden sleepers with concrete ones (see also section B.3.2.2);
- **Sidings and service facility tracks**[44] which display technical specificities being similar to those of low traffic lines (with even lower ballast thickness);
- **Private railroads**[45]: besides State- of NRIM-owned (national rail infrastructure managers) tracks, there are also private railways owned by different owners. Some of these sidings interoperate with the public network. Other exist solely for internal use in industrial areas, as logistic nodes or tourist attractions. Traffic on these private railroads varies hugely: from occasional train visits to millions of tons of cargo transported annually. For instance in Finland, over 1,000 km tracks are private railroads and approx. 95% of those private railways are equipped with wooden creosoted sleepers (UIC, 2013). In France, 1,200 km of railroads are operated by about 100 tourist railway companies and transport 3.7 million visitors a year (UNECTO, 2022). In the European Union, there are 400 tourist railroads

[43] Low-traffic lines - as opposed to high-traffic lines - are main lines for which the transport of passengers and goods is low in terms of tonnage. The categorization of lines according to tonnage is based on the classification developed by the International Union of Railways (UIC). Main lines are defined as running tracks, that is, "tracks providing end-to-end line continuity and used for trains between stations or places indicated in tariffs as independent points of departure or arrival for the conveyance of passengers or goods" (Eurostat, UNECE, 2002).

[44] As determined by a 2021 IRG-Rail report, the understanding of the term "siding" is heterogeneous among IRG-Rail members. In this dossier, the latter is defined as follows based on the definitions submitted by the Spanish and the British regulatory bodies: A short railway track beside the main tracks. It is a low-speed track section distinct from a running line or through-route. A siding is where engines and carriages are left when they are not being used. A siding can be used for marshalling, stabling, storing and unloading vehicles. It is often connected to a running line. A siding can also be used to regulate traffic. Besides, for some IRG-Rail members, service facility tracks are considered as a sub-category of sidings while for others there are considered as a separate kind of tracks. Hence, the DS uses the wording "sidings and service facility tracks" in the remainder of this restriction dossier.

[45] Private railroads include private sidings as well as tourist, heritage and preserved railroads. Private sidings are defined as "Track or set of tracks which do not belong to the railway enterprise but are linked up with the track of a railway enterprise so that an industrial, commercial or port, etc. establishment or group of establishments can be served by rail without trans-shipment" (Eurostat, UNECE, 2002). For the sake of readability, the DS will use the term "tourist railroads" in the remainder of this dossier, which refers to tourist, historic and preserved railroads.

carrying 25 million visitors each year (UNECTO, 2022). These railroads are also mostly equipped with wooden sleepers.

From a technical perspective, the replacing of wooden sleepers by concrete sleepers is also constrained for switches and crossings due to their important diversity, but also tunnels and bridges - these installations being notably constrained by the thickness of ballast that can be put in place - or portions of track with a reduced gauge, tight curves etc. (CGEDD, 2017; UIC, 2013).

Figure B - 2 to Figure B - 4 below, adapted from the SUWOS report (UIC, 2013), provide an overview of the use of the different kind of sleepers used in railway infrastructure for 12 countries of the EEA. These figures are somewhat old (2010) but allow to account for the still-remaining significant use of wooden sleepers in the European networks. This type of sleepers is present on all types of tracks but particularly on side tracks and switches.

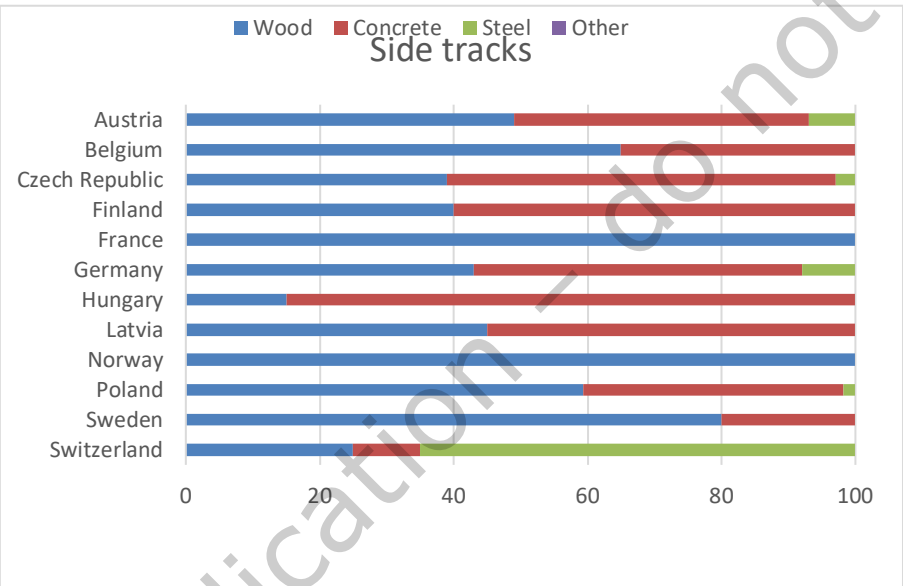

Figure B - 2: Use ratio between concrete and wooden sleepers in side tracks in European railways (figures for 2010, from UIC, 2013)

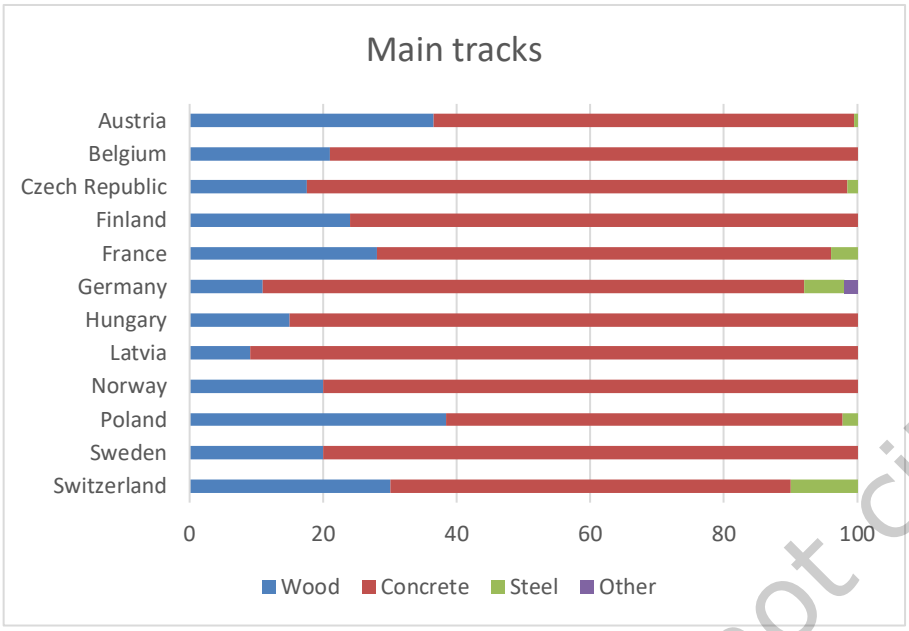

Figure B - 3: Use ratio between concrete and wooden sleepers in main tracks in European railways (figures for 2010, from UIC, 2013)

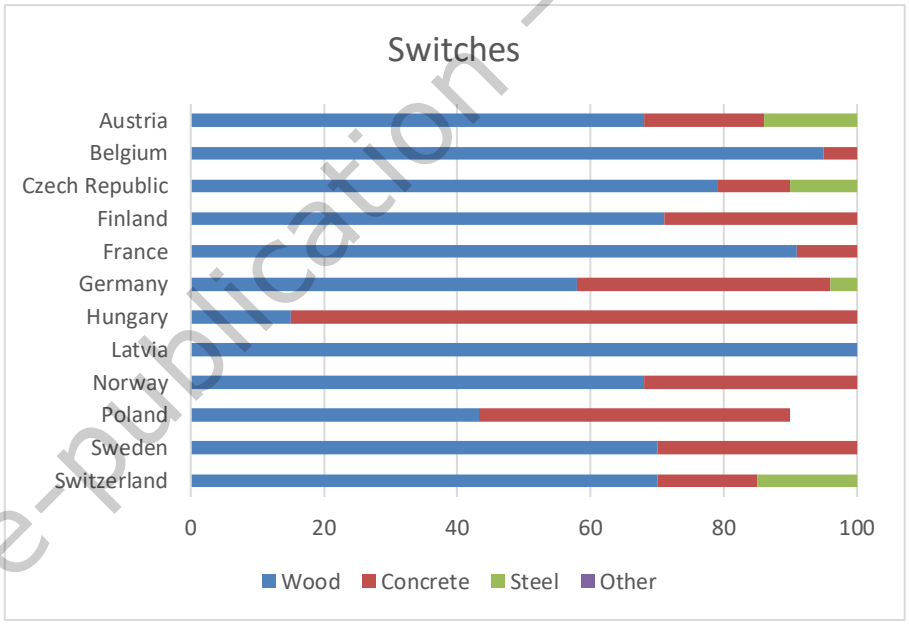

Figure B - 4: Use ratio between concrete and wooden sleepers in switches in European railways (figures for 2010, from UIC, 2013)

The survey conducted by the UIC in the framework of the SUWOS report (UIC, 2013) estimated the annual demand from NRIM for wooden sleepers in Europe to be 160,030 m^3

in 2010, namely 1,640,000 sleepers[46] (for approximately 70% of coverage of European rail infrastructure). The information gathered through the public consultation conducted as part of the evaluation of applications for renewal of approval of creosote-base substances under the BPR as well as the consultation of competent authorities and stakeholders carried out in the framework of the preparation of this dossier confirmed this order of magnitude: in 2020 the demand from the Belgian, Finnish, French and Portuguese railway networks was about 670,000 sleepers (i.e. about 40% of the annual demand reported by the SUWOS report for 2010[47] for about 20% of the European network in length (UNECE, 2021)[48]).

According to the SUWOS report (UIC, 2013)**, 95% of wooden sleepers were treated with creosote in 2010.** This treatment of wood is necessary because of the putrescible character of the autochthonous timber species and allows to extend the life of a sleeper from 10 to 30 years. Indeed, mainly three timber species are used to produce railway sleepers: oak, pine and beech, the different level of impregnated creosote guaranteeing more or less the same lifespan of approximately 40 years (UIC, 2013)[49]. The information gathered during the public consultations, highlighting in particular the lack of satisfactory alternatives to creosote, confirmed that most wooden sleepers installed in European railway networks were treated with creosote (see section E.2 for further details on existing alternatives). **Therefore, in the remainder of this report, The Dossier Submitter assumed that all wooden sleepers are treated with creosote.** This overestimating assumption is used to determine the reuse volumes of creosoted railway sleepers.

B.3.2. Reuse

B.3.2.1. Supply of railway sleepers for reuse

This section has been written on the basis of the information provided by surveyed national rail infrastructure managers (NRIMs) involved in the reuse of creosote-treated railway sleepers and related MSCAs to the DS. Therefore, its content does not allow to document all reuse practices. However, the DS was able to consult the main European NRIMs and therefore considers the representativeness of the following section to be satisfactory.

Creosoted sleepers for reuse are made available from network regeneration operations, in particular in a context of replacing of wooden sleepers by concrete sleepers

[46] The characteristics that must be fulfilled by the wooden sleepers are defined by the referentials EN 13 145 and CT IGEV 506. These specify in particular the dimensions of the sleepers which are 2.6 meters (m) long, 25 cm wide, 15 cm thick (namely 0.0975 m^3) and weight approximately 80 kg. Wooden sleepers used for turnouts, crossings and switches have lengths which vary from 2.6 m to 6m (Chem Advocacy, 2014).

[47] Survey covering approximately 70% of coverage of European rail infrastructure.

[48] https://w3.unece.org/PXWeb/en/CountryRanking?IndicatorCode=42

[49] 51% of the railway sleepers purchased by the infrastructure managers surveyed by the UIC in 2010 were made of oak, 25% of pine, 21% of beech, and exotic wood represented 2% of the reported volumes. Pine is mainly used in Finland, Sweden and Poland (94% of pine use volumes). Beech is mainly used in Switzerland, Germany, Norway and Austria (95% of beech use volumes) but the network operators of these countries also use oak sleepers.

on the main lines[50]. As an illustration, in France each year about 1,000 km of regeneration worksites are carried out on the SNCF network and generate the removal of about 800,000 sleepers per year (SNCF Réseau hearing). A part of these volumes of used creosoted sleepers (whose age can be very variable) are in good condition enough allowing their reuse[51]. The NRIM implementing reuse practices have reported to set up a sorting and storage process at the time of these works in order to allow the reuse. Thus, **reuse is decided on the basis of a simple visual inspection of the sleepers. No renovation is required**, only removal of the lag screws (metal parts) before packaging and storage occurs. The sleepers are in principle never repaired or retreated[52] (however, retreating of a part of the sleeper *in situ* can be done). **The service-life of a reused sleeper is at least 20 years and reused sleepers are reported to have the same installation and maintenance costs as new creosoted sleepers**.

In France, there appears to be an overall excess supply of used sleepers available for reuse compared to the demand. Even if the volumes of wooden sleepers installed are decreasing due to the progressive replacing of wooden sleepers by concrete sleepers during regeneration works, **it is likely that the volumes of wooden sleepers available for reuse** (and consequently the excess supply) **will be maintained over the next few decades** (SNCF Réseau hearing). Indeed, the maintenance of a significant mileage of lines equipped with wooden sleepers and presenting a slower regeneration cycle than the high traffic lines should allow to generate a sufficient volume of sleepers available for reuse. However, the representativeness of the French situation for the whole EEA could not be verified by the DS due to the short period of time available for the elaboration of this dossier. The public consultation on the dossier may bring information on this issue.

In France, removed and reusable sleepers are stored locally (no single storage facility at national level) and reuse operations are also carried out on a territorial basis.

B.3.2.2. Demand for railway sleepers for reuse

Wooden railway sleepers treated with creosote can be reused if the condition of the material allows it. **Reuse practices can be implemented by the original user** – i.e., national rail infrastructure managers – **or by another user having benefited from the sale or donation of the used sleepers** – private sidings or tourist railroads. **Theoretically, these reuse practices can be implemented within sufficiently dense**

[50] Main lines are defined as running tracks, that is, "tracks providing end-to-end line continuity and used for trains between stations or places indicated in tariffs as independent points of departure or arrival for the conveyance of passengers or goods" (Eurostat, UNECE, 2002).

[51] It is estimated that 20% of the dismantled creosote-treated wooden sleepers are eligible for reuse because of their good condition, the remaining 80% are disposed by the NRIMs as hazardous waste (source: SNCF Réseau hearing).

[52] However, the German MSCA reported the following procedure to be implemented while mentioning that no reuse is implemented by the German rail infrastructure manager: "All metal parts (reinforcements to hold the rail tracks) are removed from the railway sleepers. After this, the sleepers are checked to decide if they are reusable (If not, they will be shredded). For reuse the drill holes are filled, the surfaces of the sleepers are milled and reinforcements are mounted. Afterwards, these reinforced railway sleepers will be used again for the same purpose as primary."

and large networks. In the EEA, **such practices could be implemented in Germany, Spain, France and Italy** (SNCF hearing).

Qualitative and quantitative data on the implementation of reuse practices for railway sleepers available is very scarce, therefore MSCA in the EEA and a selection of national rail infrastructure managers (NRIMs) have been asked to report the situation on that matter in their country. **The implementation of reuse practices has been directly reported for France and Finland** (see Table A - 5). Marginal reuse volumes were reported for Norway and the Czech Republic, as well as the absence of reuse in the part of the German network managed by the Deustche Bahn (87% of the German network). Reuse in Germany is consequently considered as marginal by the Dossier Submitter. The absence of reuse was also reported for the Spanish network managed by ADIF. No information is available in the BPC Renewal Assessment Report nor from the results of the associated public consultation on the authorization of the primary use of creosote treated sleepers in Italy. Furthermore, no information on the existence of reuse practices could be obtained from these documents. The time available for the elaboration of this restriction dossier and the contribution of the surveyed stakeholders (MSCA and NRIMs) did not allow to confirm or disprove the existence of primary use or reuse of creosoted railway sleepers for this Member State. **In the remainder of this restriction dossier, The Dossier Submitter therefore considered that the reuse of creosoted sleepers takes place in France, Finland and Italy.** Such an approach may lead to an overestimation of reuse volumes but this should avoid the impact of the proposed restriction to be underestimated.

The reuse of wooden railway sleepers is implemented by the NRIMs mainly in low traffic lines as well as in sidings and service facility tracks as part of a circular economy approach. **Reuse allows to reduce acquisition costs and waste management costs for NIRMs.** In France, the reuse of used creosote-treated wooden sleepers is a long-standing practice that contributes to the preservation of low-traffic lines. Indeed, while these lines belong to the SNCF network, they are not included in the network regeneration contract agreed by the State. It is therefore the local decision-makers who decide and finance the regeneration works of the tracks. The volumes of sleepers available for reuse allow for the conduct of this regeneration work at a lower cost. Moreover, the reuse of used creosote-treated wooden sleepers is relevant from a safety perspective, since the low speed of traffic is associated with a low level of risk and therefore with lower level of requirement in terms of track quality compared to high-traffic lines (SNCF Réseau hearing). The reuse of used sleepers also favours the maintenance of freight (Finnish NIRM).

The sale of used sleepers to private networks (private sidings and tourist railroads) has been reported in Finland. Such practices also existed in France before the enforcement of the Decree of December 18, 2018 relating to the restriction of use and marketing of certain treated wood came into force. **The reuse of used sleepers allows these private network managers to maintain their network at a lower cost.**

Estimate of annual reuse volumes of railway sleepers treated with creosote in the EEA

Information on annual reuse volumes could be collected for France and Finland only (each year 10,000 and 20,000 to 30,000 sleepers are reused respectively). Due to the lack of available data and the short preparation time for this dossier, the Dossier Submitter has

performed an **estimation of the reuse volumes** of creosoted railway sleepers for reuse **by the original user and other users in the Italian railway network[53]**. Reuse volumes by the original user and the reuse volumes by other users are estimated separately. These volumes are mainly estimated through an extrapolation from French data based on the following assumptions.

Regarding the **reuse volumes by the original user**, it is assumed that the demand stems from networks constrained to the use of wooden sleepers (low traffic lines as well as sidings and service facility tracks, see section B.3.1). This assumption is consistent with the reuse practices described by the NRIMs (see Section B.3.2.2). **Reuse volumes are therefore assumed to be proportional to the length of these "constrained networks"**. The length of this constrained network is calculated as follows: first the total route length[54] (in kilometres) of the Italian railway network is obtained from the data produced by the Independent Regulators' Group - Rail (IRG-Rail, 2021)[55] for the year 2019 (latest data available as the DS elaborated this dossier). Second, a correction factor is applied to the 2019 total route length in order to calculate the total length of the railway network (see Equation A – 1). Indeed, the total route length corresponds to the length of the lines available for passengers and freight transport and should therefore approximately equal half of the total track length. However, such a simplification was not consistent with the structure of the French Network reported by Chem Advocacy for the year 2011[56] (Chem Advocacy 2014) and in particular did not allow for the distinction between the length of service and facility tracks and main tracks. The correction factor was therefore calculated from the French network structure for the year 2011: IRG Rail reported the 2011 total route length to equal 29,234 km, while the complete network was reported to be 61,600 km long (48,460 km of main tracks and 13,200 km of service facility tracks, Chem Advocacy, 2014).

Equation B - 1 : Total length of the railway network – Calculation method

$$\text{Total length of the railway network} = \text{main lines} + \text{sidings and service facility tracks}$$

$$= 1.66 \times \text{total route length} + 0.45 \times \text{Total route length}$$

[53] As mentioned in the previous section, according to SNCF Réseau the implementation of reuse practices is possible and relevant only in large and dense railway networks that is France, Germany, Italy and Spain. However, the German and Spanish MSCAs reported that no reuse of used creosoted sleepers takes place in the national network.

[54] Route length: Length of all routes available for freight and passenger traffic on the network of the infrastructure manager, as specified by the infrastructure manager in the Network Statement (IRG-Rail, 2016).

[55] https://www.irg-rail.eu/

[56] The report elaborated by Chem Advocacy for SNCF Réseau (Chem Advocacy, 2014) is - to the knowledge of the DS - the only publication that has calculated the size of such a "constrained network" being constrained to the use of creosoted wooden sleepers. Thus, for consistency, all extrapolation coefficients were calculated based on the structure of the French rail network in 2011.

Third, the length of the constrained network is calculated by successively applying different coefficients to the length of the total railway network *excluding high-speed lines* (see flowchart in Figure B - 5), the length of high-speed lines being also obtained from the IRG Rail 2019 data (IRG-Rail 2021). These coefficients are also calculated from the characteristics of the French network. Finally, the annual demand of sleepers for reuse is calculated by applying a demand coefficient (in number of sleepers per km) also calculated based on the French context.

Table B- 7: Extrapolation coefficients for the calculation of the constrained network (Chem Advocacy, 2014)[57]

Coefficient	Value
Share of low-traffic lines in the main lines excluding high-speed rail (HSR)	0.35
Share of low traffic lines equipped with wooden sleepers	0.63
Share of low traffic lines equipped with more than 75% wooden sleepers (apart from lines equipped with wooden sleepers also equipped with double head rails, stringer beams or joint sleepers)[a]	0.47
Share of low traffic lines equipped with wooden sleepers and double head rails (apart from lines also equipped with stringer beams or joint sleepers)[a]	0.19
Share of low traffic lines equipped with wooden sleepers and stringer beams (apart from lines also equipped with double head rails or joint sleepers)[a]	0.007
Share of low traffic lines equipped with joint sleepers – km equivalent of joint sleepers (apart from lines also equipped with double head rails or stringer beams)[a]	0.016
Annual demand for used sleepers per kilometre of constrained network[b]	0.5

[a]: The sum of these three coefficients is not equal to 1. Indeed, here we calculate the share represented by each type of technical constraint (linked to the type of rail) in the total length of the low-traffic tracks equipped with wooden sleepers and not in the total length of the "constrained network" (i.e., for the tracks equipped with less than 75% wooden sleepers, it is relevant to consider a replacing of the latter with concrete sleepers).

[b]: If we refer to the dimensions of the French rail network (i.e., belonging to SNCF Réseau) in 2011, the length of the "constrained network" is 6,746 km and that of the service tracks is 13,200 km. Moreover, SNCF Réseau reports that the demand for creosoted sleepers for reuse on its own network is 10,000 sleepers per year and that this demand is constant. Hence: 0.5 = 10,000/(6,746 + 13,200).

[57] These coefficients were calculated based on the structure of the French rail network (i.e., belonging to SNCF Réseau) in 2011.

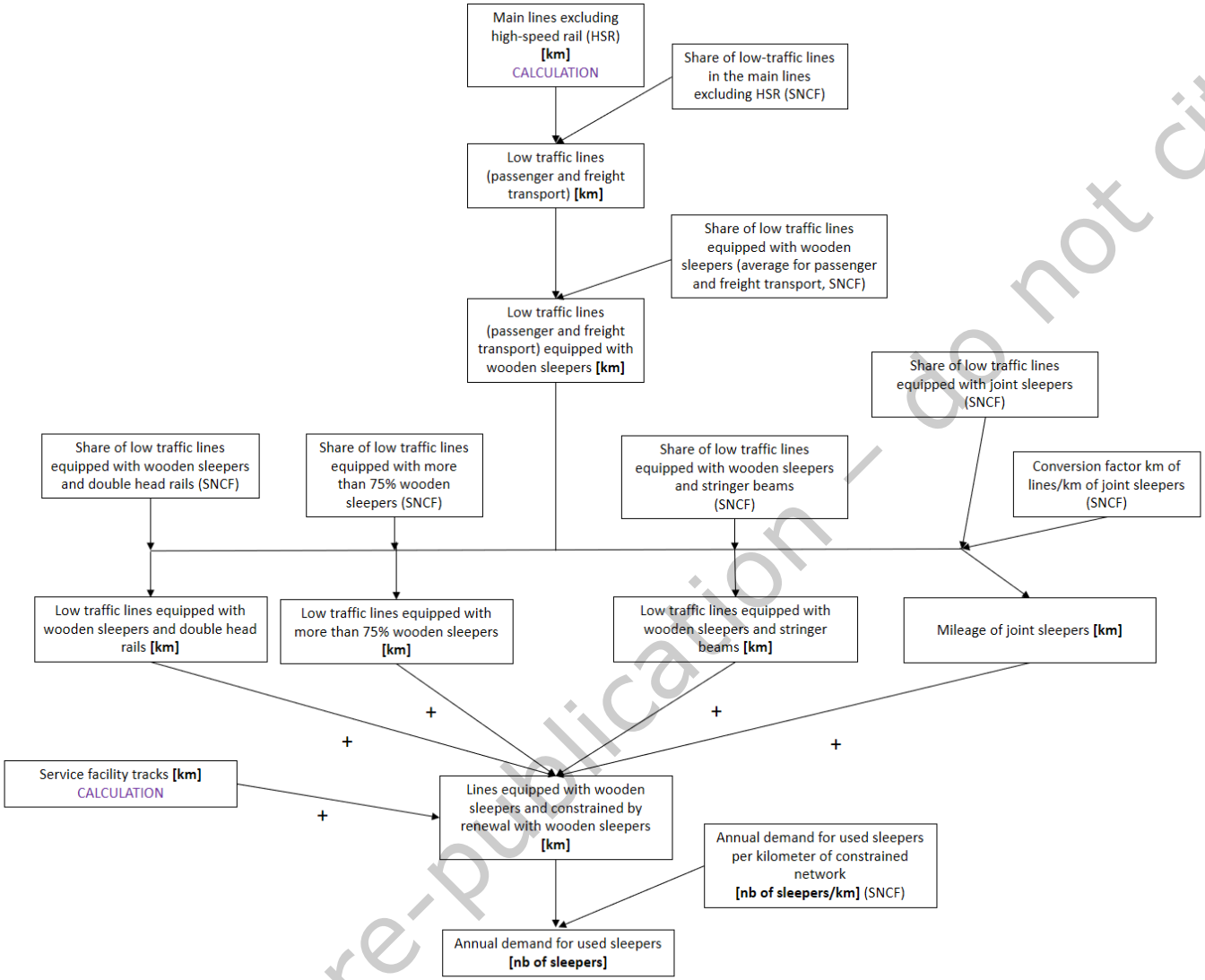

Figure B - 5: Determination of the annual demand for reusable railway sleepers - Reuse by the original user

Here, the Dossier Submitter relied heavily on the definition of "constrained networks" developed in the report elaborated by Chem Advocacy for SNCF Réseau in 2014 (Chem Advocacy, 2014). This report sought to assess the socioeconomic impact of a ban of creosote for treating railway sleepers and called for separate consideration of the following types of tracks and infrastructures for the evaluation of impacts:

- Main tracks equipped with double head rails;
- Main tracks equipped with more than 75% wooden sleepers;
- Main tracks equipped with wooden sleepers with stringer beams;
- Main tracks equipped with joint sleepers (as opposed to continuous welded rail).

On this basis, this extrapolation allows the Dossier Submitter to determine **the size of the constrained networks for Italy: and 12,761 km** (4,419 km for main lines and 8,341 km for sidings and service facility tracks) based on 18,475 km total route length (IGR-Rail, 2021). Nevertheless, several uncertainties are associated with the result of this calculation. Indeed, this calculation is based on two hypotheses whose validity could not be assessed by the Dossier Submitter:

- The Italian network has a similar track distribution to the French network in terms of traffic level and type of sleepers (wooden sleepers, concrete sleepers, etc.);
- The types of tracks and infrastructures whose technical constraints require the use of wooden sleepers are present in the same proportions in the Italian network as in the French network;

The French network is among the European networks with the highest percentage of wooden sleepers (see Figure B-2, Figure B-3 and Figure B-4). Therefore, **the Dossier Submitter considers that** basing the estimate of demand for sleepers for reuse by the original user on the characteristics of the French network is likely to lead to an **overestimation of reuse volumes**.

The volumes of reuse by users other than the original user are estimated on the basis of a simplifying hypothesis based on the French context. Indeed, today 10,000 sleepers are reused each year by SNCF Réseau (i.e., original user), however before the French Decree of December 18, 2018 came into force, 40,000 other sleepers were sold by SNCF Réseau and reused by other users on private railroads (tourist/preserved railroads, industrial infrastructures, etc.). As the resale of used sleepers by NRIM is still allowed nowadays in the rest of the EEA, **it is assumed that the reuse volumes by users other than the original user are four times higher than the reuse volumes by the original user**.

Here also, several uncertainties are associated with the result of this calculation. First of all, the short time available for the preparation of this dossier did not allow to confirm or disprove the actual existence of reuse of railway sleepers by users other than the original user in Italy. The public consultation on the dossier may bring information on this issue. Moreover, a part (unknown by the Dossier Submitter) of this annual volume (40,000 sleepers) was sold for secondary uses and not for reuse. Furthermore, it would have been preferable to calculate the reuse volumes by other users than the original used based on the length of the private railroads in each country to get some more reliable estimates. Again, the short time available for the preparation of this dossier did not allow for the collection of such data. Based on these **the Dossier Submitter considers that the estimated reuse volumes for reuse by users other than the original user for Italy and Spain may be overestimated.**

Table B- 8: Annual reuse volumes of railway sleepers in EEA

Member States	Original user	Other users	Total (number of sleepers)
France	10,000	0	10,000
Italy	6,398	25,592	31,989
Finland	NA	NA	[20,000 ;30,000]
		Total	**[61,990 ; 71,990]**

Approximately 62,000 to 72,000 creosoted sleepers are reused in the EEA each year. The NRIMs surveyed during the preparation of this report consider that these reuse volumes will remain constant over the next few decades.

Figure B - 6: Reused wooden sleepers, Lapinjärvi, Finland, August 2021 (source: FTI Finland)

B.3.4 Secondary use

As mentioned previously, secondary uses of creosote-treated railway sleepers have been reported in the EEA (MSCA consultation and hearings; CGEDD, 2017; see also). Due to the lack of available data, these secondary uses could only be documented qualitatively (see section B.2.3. and Table 3).

Annex C. Alternatives

This restriction proposal aim to cover the secondary-use of wood treated with creosote while ensuring a proper articulation between BPR (under which is delivered the first authorisation for placing on the market) and REACH regulations (under which is proposed this restriction dossier and that regulates already treated-articles). For this reason, the different alternatives related to the substance creosote will be directly referenced to the documents produced for the first placed on the market uses and they will not be described in details in this section. Moreover, the substitution of creosote by these alternatives is the remit of BPR which objective is to decrease the use of a biocidal substances and treated articles classified as carcinogen cat. 1B, PBT, vPvB substance. As derogation for use of this substance were substanciated under BPR and is not in the remit of REACH, the socio-economic impact of the restriction proposal in regards to these alternatives for replacing reuses and secondary uses of creosote treated wood has not been assessed.

The documents produced under the biocidal products regulation containing information on alternatives to creosote treated wood are the RAR Creosote Product-type 8 (RAR, 2021), which summarised the public consultation launched by ECHA to investigate the availability of suitable and sufficient alternatives. Additional elements can be found from the BPC Opinion on the application for renewal of the approval of the active substance: creosote Product type: 8 (ECHA/BPC, 2020) as well as in the ECHA Public consultation on derogation to the exclusion criteria for PT 8 creosote (ECHA, March 2021). Moreover, we took into consideration the CGEDD report (CGEDD, May 2017) from the French authorities on the impact assessment of an interdiction of creosote in France and the Chem-Advocacy document (2014) which analysed the alternatives for railway sleepers.

Based on the evaluation of the information submitted during the public consultations the alternatives for the uses of creosote are identified for wooden railway sleepers, transmission poles as well as for fencing (equestrian, agricultural), agricultural posts/stakes and hop poles (RAR, 2021). Many suitable chemical as well as non-chemical alternatives are available for most of the first use of creosote. However, additional time is needed to enable the necessary progress on the availability and technical applicability of these alternatives. In addition, it must be noted that the technical applicability of the alternatives for the use of creosote differs per Member State, for example due to a difference in geographical conditions.

Furthermore, the implementation of viable alternatives for railway sleepers as illustrated in the Chem-Advocacy report (2014) seems socio-economically very hard to realise as being deeply dependent of track morphology and constraint. In this particular case, the secondary-hand use of railway sleepers, for the same use and by the same user as defined at the moment of the product initial placing on the market, is often an option. With the actual availability of only few chemical alternative authorised under BPR TP8 for wood protection, the alternative to the secondary-hand use of wood treated with creoseote seems to be the use of new wood treated with creosote, if no other chemical or non-chemical alternative for creosote is available and economically sustainable.

In conclusion, within the scope of this proposal, the differents alternatives mentioned under the BPR are considered technically valid. Moreover, primary use of creosote treated wood is the only socio-economically affordable available alternative to secondary-use while awaiting for socio-economically suitable and affordable chemical and non-chemical alternatives of wood treated with creoseote.