

WOODEN SLEEPERS TREATMENT AND ALTERNATIVES PROJECT

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SNCF: STAKEHOLDER OF TREATED WOOD INDUSTRY

SNCF treated wood sleepers factory in Bretenoux
(Midi-Pyrénées region):

- Treated wood volume: **45 000 tons /year.**
- Wood species: oak (85%) and Azobé (15%).

Treated wood sleepers by suppliers: **2 000 tons/year.**

SNCF: WOODEN SLEEPERS USER

SNCF rail network:

- **60 000 km** of tracks
- **46 millions** of wooden sleepers

Need: 360 000 treated wooden sleepers/year.

**Railway companies need wood
for technical (elasticity and weight)
and economical reasons**

ALTERNATIVES TO CREOSOTE PROJECT

SNCF has started this project in 2014.

Collaboration with European railway infrastructure managers.

Alternatives to creosote :

- ✓ should present a global risk to employee health significantly lower than creosote;
- ✓ should meet technical requirements;
- ✓ whose environmental and health record is at least equivalent to that of creosote wood; or which do not present any other major economic and / or practical inconvenience;
- ✓ should be available on the market

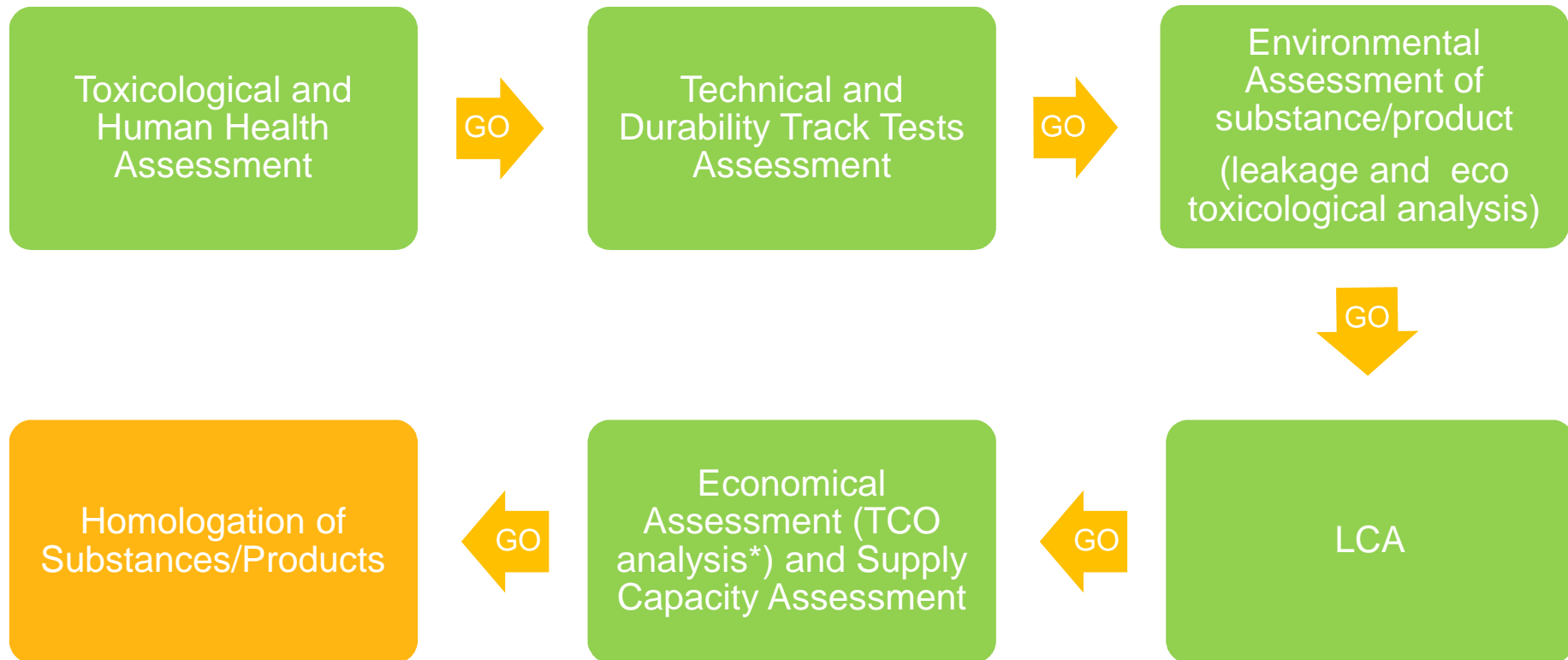
CONDITIONS FOR A GOOD ALTERNATIVE:

Even if these alternatives have similar technical criteria to the creosote-treated wooden sleepers, there are still **unknowns about their environmental and health safety, end-of-life management and chemical composition.**

An homologation process is necessary before deploying alternatives to the national rail network.

Durability and technical efficiency tests, LCA, human health and environment impact assessment of alternatives **managed directly by users to have objective results.**

HOMOLOGATION STRATEGY



- TCO (Total Cost Ownership) analysis = estimation of the expenses associated with purchasing, deploying, using and retiring a product .

TOXICOLOGICAL ET HUMAN HEALTH ASSESSMENT

Toxicological profiles are carried out by pharmacists and harmonized and validated by a labour doctor.

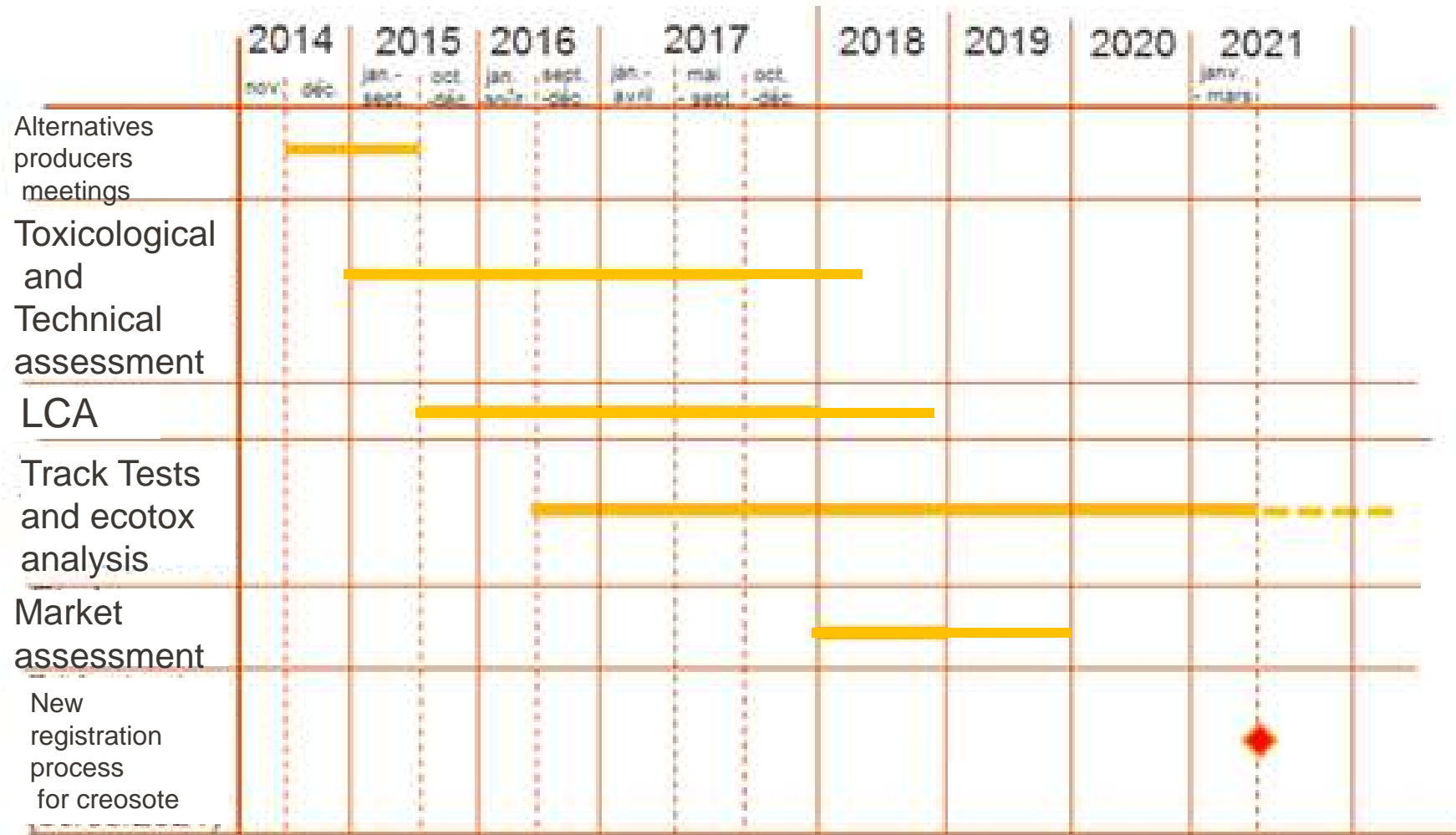
The approach:

- to be based on the compositions of the products (most exhaustive possible provides by the substance producer);
- to look at classification associated with each compound;
- to check that the classification of the product corresponds to the classification given by the producer;
- to check that the management measures suggested by the producer are in adequacy with observed classification;
- to add additional management measures, if they are insufficient.

HOMOLOGATION STRATEGY

1. **Holistic approach:** Technical performance, Human Health and LCA .
2. Durability and technical efficiency tests, LCA, human health and environment impact assessment of alternatives **managed directly by users** and not by alternatives suppliers to have objective results.
3. **To create a huge European market** (need of users network) and to homologate more than one alternative to encourage alternatives firms to invest more:
 - in R&D to find new alternatives with lesser and lesser impact on environment and human health (and cheaper);
 - in production capacity to cover the demand for sleepers.

ALTERNATIVES PROJECT ROADMAP



ALTERNATIVES TO CREOSOTE PROJECT

- Rail Infrastructure Managers want **return of experience with real scale tests before to approve definitively new substances.**

But they cannot get sleepers in big quantity because there is no treatment plant (industrial or semi-industrial scale) using these new substances (exception: Fürstenberg plant with SleeperProtect)...

- Wood Preservation Industry cannot switch to another product if this product is not ordered by Railway Infrastructure Managers.

ALTERNATIVES TO CREOSOTE PROJECT

Development of creosote alternatives can meet some difficulties due to actual **absence of market for creosote alternatives**.

In order to create a huge European market and to encourage alternatives producers to invest more:

- ✓ in R&D to find and develop new alternatives;
- ✓ in production capacity to cover the demand for treated wood customers.

SNCF initiative: in January 2018, creation of
Creosote and Treated Wood European Users Network -
CTWEUN

CREOSOTE AND TREATED WOOD EUROPEAN USERS NETWORK

- ✓ **to help users to do free and conscious choices on alternatives accordingly to their company strategy.**
- ✓ **to avoid monopoles** by challenging firms to search for alternatives that would be technically, environmentally and sanitarilly always more performant and cheaper.
- ✓ **to have the possibility to change easily alternatives in a market totally dependent on European regulation.**
- ✓ **to show competent authorities that:**
 - we are responsible industries,
 - we want to create a favourable context for alternatives development,
 - we are committed to pooling efforts and knowledge at European level.

| | |
|----------------------|--------------------|
| DURWOOD | Belgium |
| Rail Europe | Belgium |
| SGH | International |
| Hz Infrastruktura | Croatian railways |
| Corbat Holding | Switzerland |
| INFRABEL | Belgian railways |
| ZSR | Slovak railways |
| RTE | France |
| SGH | International |
| CCB | Belgium |
| SNCF RESEAU | French railways |
| FCBA | France |
| RTE | France |
| ENEDIS | France |
| MARGHERITELLI | Italy |
| PRORAIL | Dutch railways |
| BARET | France |
| SNCF RESEAU | French railways |
| OBB Infrastruktur | Austrian railways |
| SBB AG Infrastruktur | Swiss railways |
| Fürstenberg | Germany |
| SNCF RESEAU | French railways |
| MAV | Hungarian railways |
| UIC | International |
| Hz Infrastruktura | Croatian railways |

ACTUAL INDUSTRIAL MEMBERS

TRACK TESTS – ISSUES

Track tests in real conditions is the most important step to allow a decision in the coming years about the tested alternatives, to replace definitively creosote.

To have representatives results (statistical analysis) to compare alternatives and to assess their durability and technical efficiency, **it is necessary to test a large number of treated sleepers, over different climate zones (5 or 6 for France).**

The problem is that the treated wood factories **cannot treat wooden sleepers with more than one alternative.**

Furthermore, SNCF is a stakeholder of treated wood industry and it needs to have **information regarding treatment process** adapted to the selected alternatives to apply to its factory and how these new products need to be applied to have an optimal result, from technical and economic point of view.

TRACK TESTS – SOLUTION

In 2018 SNCF starts a **3 years collaboration with the new start up DURWOOD, a semi industrial structure** which can produce enough sleepers **treated with several alternatives** to allow to install them in track **for testing them in the same time and in the same area to compare them (statistical assessment).**

DURWOOD works with:

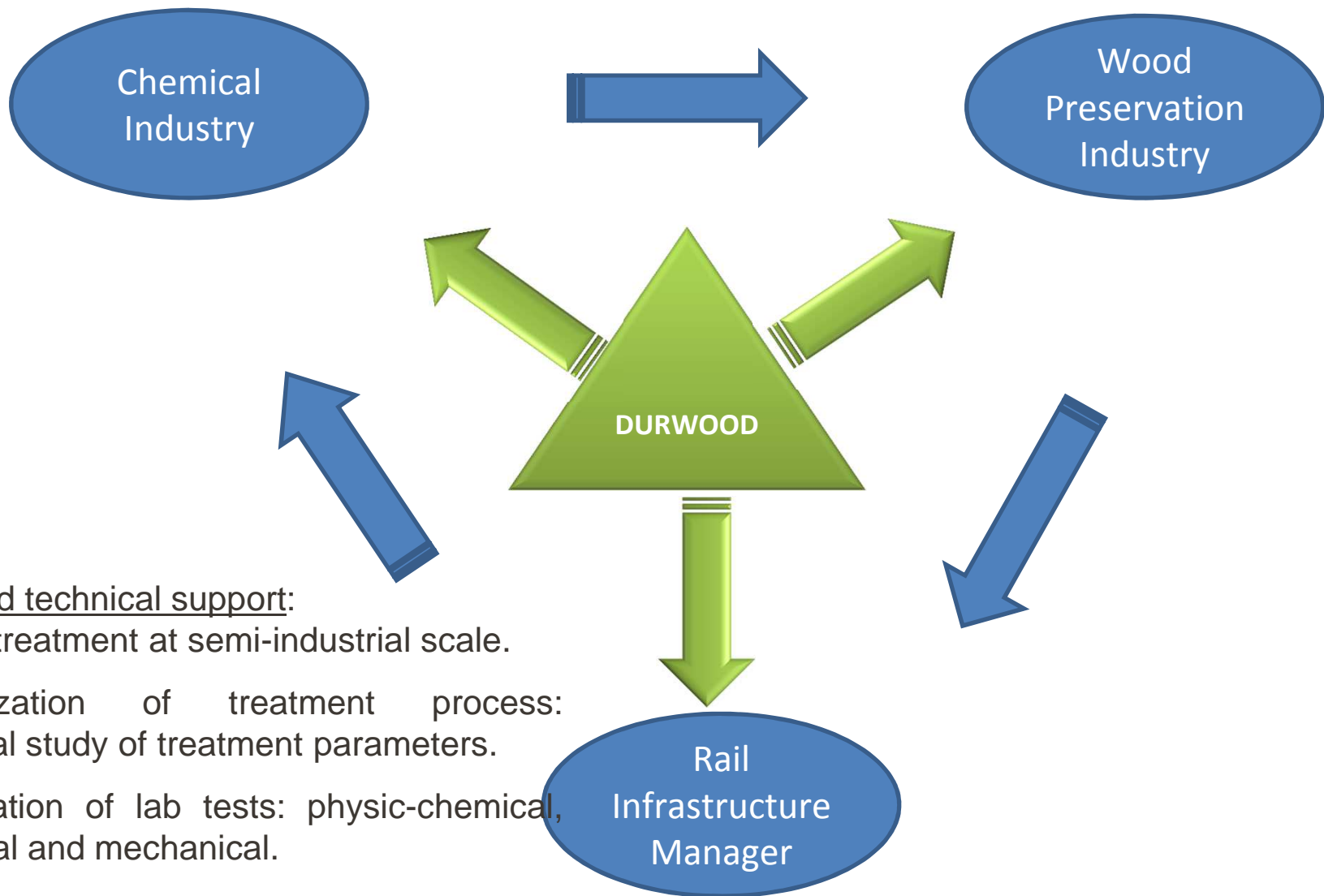
- ✓ **University of Gembloux Agro Biotech (Belgium):** Department SIMA: (Statistic and Modelisation applied to the bio-engineering)
- ✓ **Technological Institute FCBA (France):** Biological laboratory.

DURWOOD can test 4 wood preservatives at the same times
(flexibility of the treatment plant with 4 filling tanks)

It can tests on **utility poles too.**

DURWOOD START UP

Independent Industrial Laboratory



Services and technical support:

1. Wood treatment at semi-industrial scale.
2. Optimization of treatment process: statistical study of treatment parameters.
3. Realization of lab tests: physic-chemical, biological and mechanical.
4. Accelerated aging in climatic room.

✓ No patent/license/exclusivity.

ALTERNATIVES TRACK TESTS

- Duration: 3 years
- Finalization of Experimental protocol: June 2018
- Starting Project: September 2018
- Selection of substances to include in the project scope
 - ✓ Focus on Copper based preservatives (water-borne and oil-borne):
 - Oil-borne: Lonza, Koppers, Nysus,...
 - Water-borne: Rütgers, BASF, Obermeyer, Koppers, Lonza,...
 - Combination water-borne and oil
 - ✓ Multicriteria evaluation (Human health, chemical composition, technical data,...)
 - ✓ 4 to max 6 different substances in the scope of this project
- Preparation of material (impregnated oak sleepers) for field tests destined to measure long term efficacy/environmental impact:
- Into the track in real conditions - distribution through the French climate areas and as far as possible where termites are present.
- Compilation of data's in a GIS
- Eco toxicological test on soils

ALTERNATIVES LABORATORY TESTS

- ✓ Biological tests (insects/fungi) - after accelerated aging;
- ✓ Copper retention/penetration measures;
- ✓ Environmental impact: leaching tests;
- ✓ Other technical aspects: conductivity, corrosion, mechanical properties, ...

TREATMENT PROCESS OPTIMISATION

Statistical analysis of correlation's between influence factors

| | Treatment process | Wood |
|--|---|---|
| Influence factors on penetration/retention | Treatment methodology (Bethell, Rüping,...) | Moisture |
| | T° solution Concentration solution | Density Proportion heartwood/sapwood |
| | Value and duration pressure and vacuum phases | T° |

LABORATORY EXPECTED OUTCOME

1. **Efficacy, performance** over time and **information or « trends »** : evaluated through the biological tests, leaching tests and accelerated aging. Confirmed (or not) later by return of experience from field tests.
2. **Statistical relations between factors influencing retention/penetration.** This part of project will give precious information for a potential industrialization phase of a selected alternative. **Technical-economical optimum** will be evaluated.

TRACK TESTS EXPECTED OUTCOME

- 1) **Efficacy and performance** of wooden sleepers treated by tested alternatives compared with creosote treated sleepers.
- 2) **Environmental impact assessment** on soils and water.

CONCLUSIONS

There are **still many unknowns** regarding alternatives sanitary and environmental safety, their end-of-life management, their technical efficiency and their industrial application.

The introduction of new products requires **several years of study**, adaptation, experimentation and evaluation to secure a viable technical solution.

In this sense, the European biocides regulation allows the emergence of reliable and globally controlled solutions.

With this **rigorous research protocol**, the goal is to avoid the pitfall of taking a false alternative.

Each technically selected alternative is subject to the following problem:

Are creosote alternative impacts on human health and the environment lower than those caused by creosote?



Thank you