

Creosote Sustainability and Supply Chain Considerations

RailTEC

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Koppers – A Responsible Care® Company

- Koppers obtained RC14001 certification in August 2015.
- This is an ongoing voluntary commitment to improve our performances in the fields of environmental protection, occupational safety and health protection, plant safety, product stewardship and logistics, as well as to continuously improve dialog with our neighbors and the public.
- CEO-level commitment to uphold the program elements



Discussion Topics

- Why Creosote Treated Wood Ties?
- What's the Deal with Creo/Borate Dual Treatment?
- Creosote Production
- EPA Registration Status
- Creosote Supply Sustainability
- Conclusions

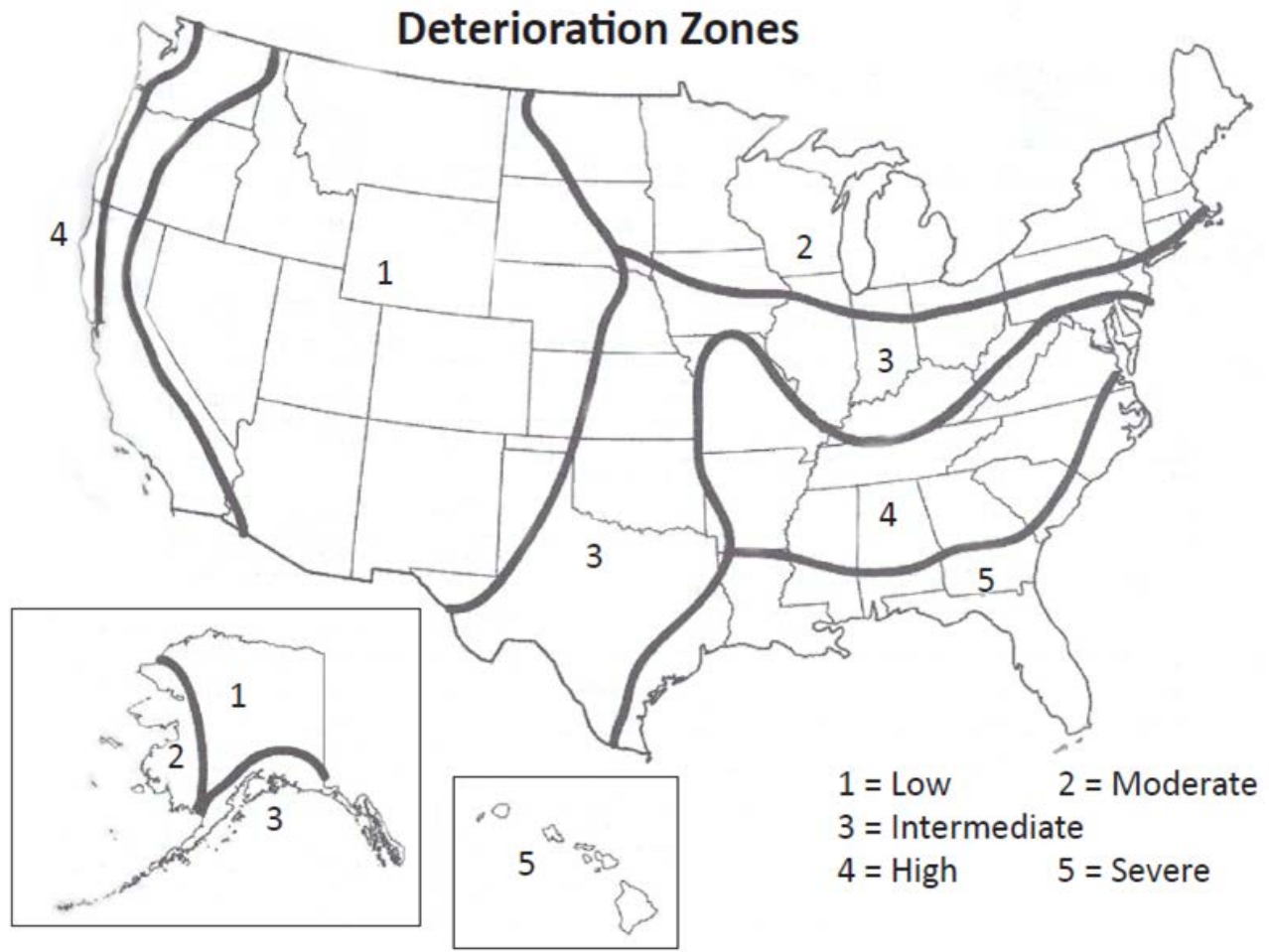


Why Creosote Treated Wood Ties?

- Wood is a renewable resource!
- Creosote is a highly effective biocide that has been used for wood preservation for over 150 years.
- Creosote continues to be the preservative of choice in >90% of wooden crossties in North America.
- Creosote and Creosote containing systems are proven to be one of the most efficacious wood preservatives ever tested and provide water repellency resulting in a longer lasting tie.
- Creosote-treated railroad ties offers lower fossil fuel and water use and lower environmental impacts than similar products manufactured of concrete and P/C. (Bolin and Smith, April 2013)
- Creosote treated wooden ties can be recycled for energy production.
- Under EPA's "treated articles exemption," railroad crossties, that have been pressure-treated with FIFRA-registered creosote wood preservatives are not classified as hazardous.



What's the Deal with Creo/Borate Dual Treatment?



What's the Deal with Creo/Borate Dual Treatment?

- Over 20 years of research and development into dual treated ties with the NS and CN being the first Class I's to start installation in 2005.
- Koppers installed their first borate treatment system in 2010.
- Currently 6 of 9 Koppers plants have dual treatment capabilities.
- Estimate that about 50% of the wooden crosstie market is currently being dual treated.



What's the Deal with Creo/Borate Dual Treatment?

U1-13 USE CATEGORY SYSTEM: USER SPECIFICATION FOR TREATED WOOD

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3.0 PRESERVATIVE RETENTION SPECIFICATIONS (Crossies and Switchties) – UC4A, UC4B, UC4C

Retentions in English (pcf) units

Use Category System (UC4A, UC4B and UC4C)	Retention Specification by Gauge (pcf).			
	Creosote		Cu Naphthenate ¹	SBX Pre-Treatment ²
Species	CR	CR-S, CR-PS	CuN	SBX ³
Oak and Hickory	7.0 or Refusal	7.0 or Refusal	0.055 or Refusal	0.17
Mixed Hardwoods	7.0	7.0	0.060	0.17
Southern and Ponderosa Pine	8.0	8.0	0.060	0.17
Coastal Douglas-fir, Western Hemlock, Western Larch	8.0 or Refusal	8.0	0.060	#
Intermountain Douglas-fir	Refusal	Refusal	#	#
Jack, Red & Lodgepole Pine	6.0	7.0	#	#

Footnotes:

¹ May also be determined by assay.

² SBX pre-treated ties shall be secondarily treated with CR, CR-S, CR-PS, or CuN (for which data is submitted) for this commodity at the retention shown above.

³ The only acceptable formulation of SBX for pre-treatment of this commodity is sodium octaborate (DOT) since all supporting data is based on DOT at 0.25 pcf (4.0 kg/m³) which is equivalent to 0.17 pcf (2.7 kg/m³) B₂O₃ (SBX).

= Either no proposal for standardization and/or data demonstrating efficacy of a preservative/species combination has been submitted to AWPA; or the use of the preservative/species combination has been proven ineffective.



What's the Deal with Creo/Borate Dual Treatment?



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Long Term Life Cycle Economics Data – Railway Tie Association



Railway Tie Life (years)		
Climate Zone	Creosote (Only)	Dual-Treated Creo/Borate
1	43.3	43.3
2	39.9	39.9
3	35.9	39.9
4	30.7	39.9
5	18.1	38.6
U.S. System-wide	35.2	40.4

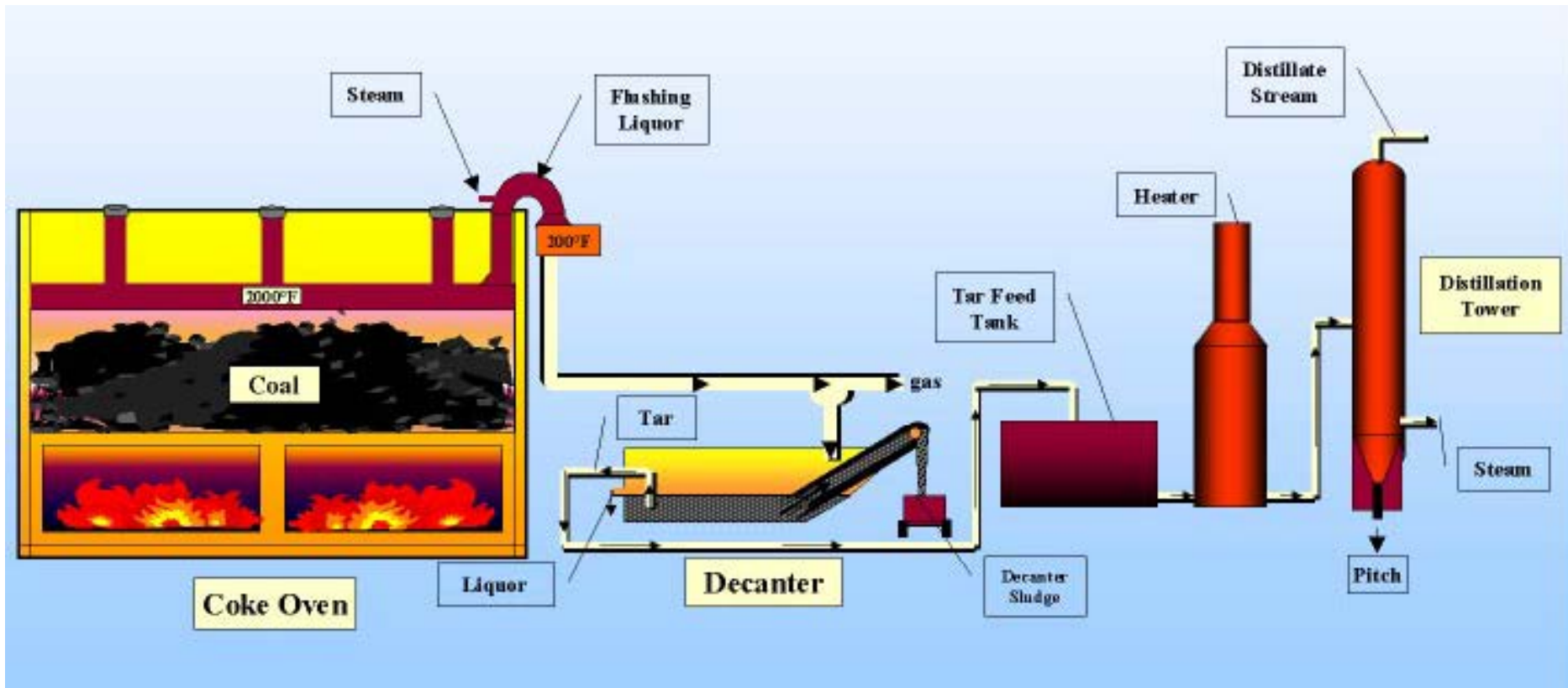
Creosote (Only) and Dual-Treated, Creo/Borate



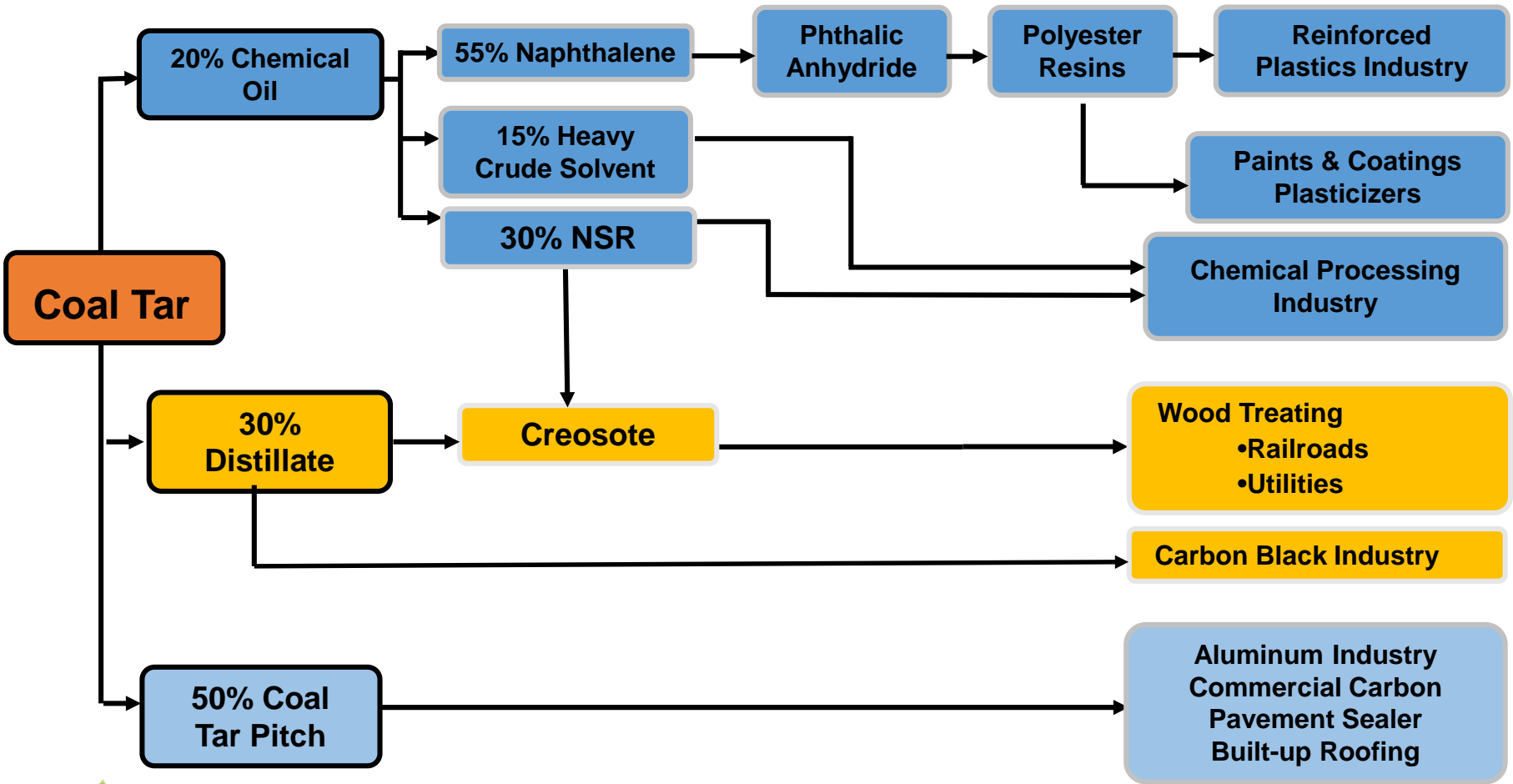
Creosote Production: It Starts with Coal Tar



Production and Distillation of Coal Tar



Coal Tar Distillation and Material Balance



Creosote Supply Sustainability

- The North American creosote demand is 250,000 – 300,000 metric tons.
- China alone has the capacity to distill 10MM metric tons of coal tar which results in 5MM metric tons of coal tar pitch and ~3.5MM metric tons of distillate that could potentially be blended into creosote.
- The aluminum industry relies on coal tar pitch to produce anodes needed for the conversion of alumina to aluminum. There is no substitute.



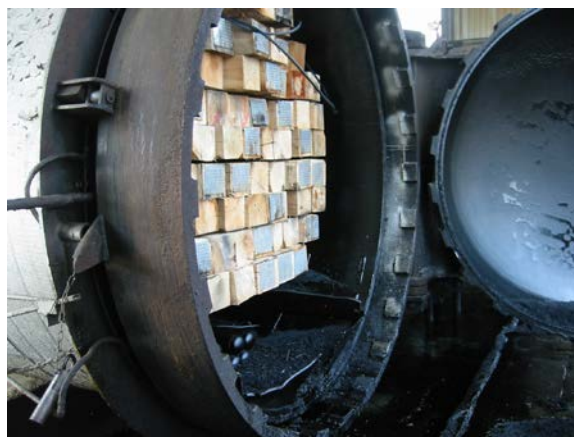
EPA Registration Status

- Creosote has been continuously registered as a wood preservative by the EPA since 1948.
- A re-registration decision was issued by EPA in 2008 (valid until 2023).
 - Required administrative and engineering controls for risk mitigation at creosote wood treatment plants.
 - Additional data requirements
 - Environmental fate and toxicology (2018)
 - Worker exposure assessment (4Q 2015)
- No indications that there is any danger of creosote losing FIFRA registration.



Koppers Commitment to Creosote

- Koppers CMC considers creosote its primary product.
- Our global businesses are vertically integrated to supply the railroad industry with quality creosote and treated crossties.



Conclusion

- Creosote or creosote/borate dual treatments are used for approximately 98.5% of the treated wood tie market.
- Long record of proven reliable performance.
- Wood is a renewable resource.
- Wood ties treated with creosote that are recycled by combustion provide a closed loop carbon and energy use cycle.
- There are currently no indications that creosote is in danger of losing FIFRA registration.
- The Railroad Tie Association, as well as Creosote Council III and other wood industry groups, are proactive in providing the resources and tools necessary to ensure treated wood ties will continue to serve the railroad industry for a very long time.

