Creosote Council III

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Bradley L. Ack (also via email to back@psat.wa.gov)
Director
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RE: Spring 2005 Sound Waves article, Removing creosote logs creates cleaner beaches.

Dear Mr. Ack:

I am writing on behalf of the Creosote Council III (CCIII) to comment on the article by Lisa Kaufman in the Spring 2005 issue of Sound Waves concerning removal of creosote treated wood. The CCIII represents the companies that manufacture and/or import creosote for use in the United States. Wood products preserved with creosote are manufactured in and imported from other states into Washington State. These products mainly consist of railroad ties, utility poles, pilings, and marine use lumber.

The situation the article describes is unfortunate, and we certainly share your concern over this unsightly intrusion on a beautiful area of the country. However, the article goes on to make many inaccurate statements about creosote, its impact on the environment, and its impact on human health. With the help of Stephen Smith who is a civil engineer with deep experience in this field and a consultant to the CCIII, I would like to address some of the inaccuracies in the article, and to provide you some background information on creosote and its role in the environment.

We also ask that you make some space available to the Creosote Council in your next newsletter and that this entire letter be posted on the PSAT web site to correct the damaging impression your article has certainly made on your audience. We hope you agree that the interests of science and sound environmental policy are not served by misinformation.

Inaccuracies

Paragraph 1 includes the statement; "creosote-soaked logs lay scattered on beaches or stand as abandoned upright pilings along the shoreline, oozing toxic chemicals into the sand and water." Creosote treated wood lasts for many decades *because* the creosote mostly stays in the wood. Some release does occur, but very slowly. Sometimes, when the treated wood is exposed to sun and hot temperatures, some tar may drip from the wood. Such tar is black, sticky, viscous, has very low solubility, and is mostly not biologically available. Human contact can cause a reversible skin irritation, which can be accentuated by exposure to sunlight. Studies of creosote workers indicate that cancers or non-cancerous life-threatening chronic diseases are not associated with exposure to creosote. See the background section for more detail. While potentially unsightly, the treated wood and such drips are not significant to the health of the aquatic environment.

Paragraph 2 states; "Scientists have only recently begun to understand the hazardous effects of creosote on humans and wildlife." This sentence is wrong on two counts. First, the EPA has considered the potential effects of creosote for more than 20 years and allows creosote to be used as a preservative for wood used in aquatic environments. EPA is currently considering the re-registration of creosote, along with other established preservatives. A great deal of new science has been conducted to support the re-registration, and based on the draft environmental and human health assessments, the EPA is expected in 2006 to approve creosote's continued use. Second, the sentence quoted above implies that scientists have recently uncovered some terrible effects. If anything, scientists continue to learn that natural systems can and do accept limited amounts of substances, such as creosote, and degrade those to non-hazardous compounds without harm. See the discussion below about the Sooke Basin study.

Paragraph 3; "Even though the state restricted the use of creosote in 1995, toxic compounds from older logs still threaten the health of children playing in tide pools and the forage fish laying eggs along the shore. Forage fish such as sand lance, surf smelt, and herring make up an important part of a salmon's diet, and are critical to recovering salmon populations. Larger organisms eat smaller organisms and pass cancer-causing compounds from creosote throughout the Sound's food web." This includes several inaccuracies:

- Creosote continues to be allowed as a wood preservative for products such as piling, marine structural lumber, and railroad ties. This situation did not change in 1995. In fact, Washington State and NOAA have repeatedly affirmed that they do not prohibit creosote treated wood use in marine environments.
- There is absolutely no indication that children could have any health threat from water in tide pools as a result of creosote treated wood in the area. Making such claims is unsupported by any science.
- The old, creosote-treated wood poses no chemical hazard to forage fish or their eggs. In fact, such wood can provide habitat needed by the fish. Measurements of PAH in mussels growing directly on creosote treated wood have demonstrated no significant increases above background concentrations and no concentrations that pose any human health concerns.
- Creosote constituents, if consumed by fish, are readily eliminated so that they do not multiply up the food chain. High concentrations of PAH and other carcinogens, such as are found in numerous urban waterways can cause cancer in flatfish that partially burry themselves in the sediments. However, increases in PAH at levels associated with creosote treated wood have been repeatedly demonstrated to be very localized (within one to two meter of the structure) and at concentrations too low to have caused any adverse effect in the animals living on or in the sediments.

The remaining paragraphs discuss progress in removing creosote treated logs. The CCIII understands that removing debris from beaches is worthwhile for aesthetic reasons. However, such efforts will have no impact on the health of the Puget Sound, nor will they assist the return of salmon runs.

<u>Background</u>

The CCIII offers the following discussion to assist in understanding the available science related to creosote treated wood in marine environments.

What is creosote? Creosote is distilled from coal tar. Coal tar results from heating coal to about 2000 ^{o}F to produce coke for use in making steel. Vapors from this process are condensed to produce coal tar. Coal tar is then distilled in much the same way as crude oil is distilled to make petroleum products. Napthalene, coal tar pitch, creosote, and tar are products of the distillation. Creosote is a black, tar-like material that is a complex mixture of many naturally occuring hydrocarbons that have been extracted from coal. It has a distictive “moth ball” aroma. It has a very low solubility in water and very low vapor pressure, so that after being pressed into the wood, it stays there for a very long time.

Creosote contains polycyclic aromatic hydrocarbons (PAHs). At high concentrations, these have the potential to be damaging to the environment, including bottom dwelling fish like flounder and sole. However, the concentrations of PAH measured around piling located where there are no other sources of PAH are generally much lower than the levels associated with adverse effects.[1]

What is the environmental impact of creosote treated wood in marine structures? Goyette and Brooks [2] reported on a study in Sooke Basin (at the south tip of Vancouver Island) where new and used creosote treated wood dolphins (clusters of pilings used as moorings or bumpers) were installed in a sensitive marine environment to determine the environmental effects. Their study found no significant reductions in benthic (bottom dwelling) organisms at any distance from the six piling dolphins. More importantly, they reported that:

> *At the end of four years, the most significant environmental response to these structures was the establishment of a diverse and abundant epifaunal* [surface attached] *community on the piling and the attraction of large numbers of Dungeness crabs, starfish, finfish and other megafauna* [larger animals] *to what had become an artificial reef.*

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[1] K. M. Brooks, Literature Review, Computer Model and Assessment of Potential Environmental Risks Associated with Creosote Treated Wood Products Used in Aquatic Environments, Revised June 1, 1997, available at http://www.wwpinstitute.org.

[2] D. Goyette and K. M. Brooks, Addendum Report, Continuation of the Sooke Basin Creosote Evaluation Study, Year Four – Day 1360 and 1540, May 12, 2001

Evidence supporting this statement is provided by the included photograph of one piling addressed in this study. Note the prolific marine growth attached to the creosote treated piling after only four years in the water.

The report also describes the development of the biological marine community from the date of installation as follows:

Sooke Basin Creosote Treated Piling
After 4 Years In Place

All of the pilings on Day 14 were relatively 'clean' with little or no evidence of new marine growth. By Day 180 [about 6 months], *a light film of brown filamentous algae had developed on the BMP* [creosote treated] *piling. This film became progressively thicker near the water's surface. A marine community had started to establish itself on the pilings by Day 384* [about 1 year]. *The amount of growth appeared to be slightly greater on the MC* [untreated control] *pilings than at the BMP site, particularly with respect to the number of mussels. By Day 1540* [about 4 years], *a diverse and abundant biological community covered the entire length of the BMP pilings. This community included mussels, barnacles, numerous starfish (up to 15 to 20 individuals per piling in some cases), plumose sea anemones, calcareous tube worms, hermit crabs, coonstripe shrimp, tunicates, marine snails, sea cucumbers, sponges, macroalgae and a host of other marine organisms. In contrast the untreated piling supported a much smaller community because the pilings were disintegrating.*

Does creosote contaminate amimals living on or near treated wood structures?
Mussels living directly on the treated wood as well as ones grown close in the above

Sooke Basin study were tested for PAH levels four years after installation of the freshly treated wood. Mussels contained less than 20 nanograms of total PAH per gram of tissue, the same as mussels grown on untreated wood and about the same as mussels grown in open water. Since the animals living directly on the treated piling do not absorb, or bioconcentrate, elevated concentrations of PAH, the PAH will not be elevated in the food chain. PAH in sediment are not concentrated by bottom dwelling animals, such as clams or mussels. Fish, even if they do consume PAH, have effective mechanisms to eliminate PAH from their systems[3]. Thus, creosote from treated wood does not contaminate the aquatic life on or near the structures or otherwise impact the aquatic food chain.

Why use creosote treated wood? Wood pilings are preserved with creosote to make them resist decay and weathering. While untreated wood in a marine environment may only last a few years, treated wood offers a useful life of many decades, often lasting 50 to 60 years. That is a long time for a relatively small investment. Construction using wood pilings is simpler and less expensive than with steel or concrete. Wood pilings float so they require less equipment to handle them, they are lighter so that smaller pile drivers can be used, and specialized tools are not required for cutting and trimming after installation. Wood is forgiving because it is flexible enough to absorb shocks yet strong enough to handle very high loads.

The installed cost of treated wood pilings is typically about half the cost of steel or concrete pilings. Two case studies document savings of roughly $2,400[4] and $1,580[5] per piling due to use of wood pilings instead of steel or concrete.

What happens to the creosote? While the creosote in treated wood will last a long time, it does eventually degrade. A number of bacteria and fungi will use creosote constituents as a food source, thus degrading these constituents. As the concentration of creosote in the wood is diminished, marine boring animals will eat the wood. Eventually, all of the creosote, including PAHs, will be broken down to the basic materials of hydrogen and carbon, thereby, recycled back to nature. This was clearly documented in the Sooke Basin report in which PAHs were noted to increase in the sediment adjacent to the pilings during the first year and then significantly declined within three to four years.

How can creosote be effective as a pesticide, yet not harmful to the aquatic environment? Remember the saying, "The dose makes the poison." Creosote is injected into the wood in high concentration in the treatment process so that it is roughly 20% of the total weight of newly treated wood. At such levels, it is toxic to organisms that would otherwise eat the wood. Creosote has very low solubility and does not readilly disolve in water during the 50 to 75 year lifespan of typical structures. This was

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[3] K. M. Brooks, Literature Review, Computer Model, and Assessment of the Potential Envioronmental Risks Associated With Creosote Treated Wood Products Used in Aquatic Environments. Revised June 1, 1997. Available at www.wwpinstitute.org.
[4] WWPI, Homeowner Chooses Treated Wood Over Steel or Concrete – Saves $58,000 On His Personal Use Dock!, available at www.wwpinstitute.org.
[5] WWPI, Treated Wood: the Win Win Solution, A case Study by the Western Wood Preservers Institute, available at www.wwpinstitute.org.

confirmed by the part per trillion dissolved PAH concentrations measured within 15cm of the dolphins by Battelle's Marine Sciences Laboratory during Environment Canada's Sooke Basin study. Goyette and Brooks (1998, 2000) hypothesized that creosote derived PAH remain in a particulate form that settles to the bottom where it is incorporated into the sediments and broken down by microbes. After about 700 days, the microbial breakdown of sedimented PAH is faster than the deminishing loss rates from the structure and sediment concentrations decline to very low values. Numerous studies have documented low concentrations of PAH within one to two meters of creosote treated wood structures.. However, the concentrations are generally less than Washington State's Sediment Quality Standards. Adverse effects on benthic macrofauna are not anticipated at these concentrations and none have been found in the real world. Because creosote is a suite of fairly labile organic compounds that are metabolized to CO_2 and water, it is more environmentally friendly than the immutable zinc lost from steel piling or the abraded polymers dumped into our oceans by plastic piling. The point is that there are environmental risks (or costs) associated with all marine construction materials and it is grossly inappropriate for PSAT to focus solely on the minimal costs associated with creosote treated wood products.

Conclusion.

While cleanup of beaches is desirable, PSAT and area residents should understand that removal of abandoned pilings may actually destroy some beneficial marine habitat. Decisions about how best to improve the environment can be complicated. Effective, accurate communication about the science involved will help agencies and the public to understand the implications and make better choices. The Creosote Council III and the Western Wood Preservers Institute remain willing to assist in your efforts. Please contact us for any more information.

Sincerely,

David Webb
Creosote Council III

cc: Dennis Hayward, WWPI (dennis@wwpinstitute.org)
Stephen T. Smith, P. E. (stephentsmith@earthlink.net)