# Agenda Item Executive Summary

**Title:** Report to Winnetka Village Council on Coal Tar Sealant Materials

**Presenter:** Winnetka Environmental & Forestry Commission

**Agenda Date:** 07/08/2014

**Consent:** [ ] YES [✔] NO

[ ] Ordinance
[ ] Resolution
[ ] Bid Authorization/Award
[✔] Policy Direction
[ ] Informational Only

**Item History:**

April 8, 2014 Council Study Session

**Executive Summary:**

During the review of the Stormwater Master Plan and related stormwater improvement projects, a Trustee raised consideration of a ban on the use of coal tar sealants as a potential local environmental regulation. Sealants are used on asphalt driveways and parking lots as a means of protecting the asphalt surface from weathering. Coal tar-based sealants contain much higher levels of a class of chemical compounds known as polycyclic aromatic hydrocarbons (PAH), some of which can harm fish, and with prolonged exposure, pose a risk of cancer in humans. The Village Council reviewed information and research provided by staff on the nature and use of coal tar at the April 8, 2014 Study Session, where the Council ultimately directed the Winnetka Environmental & Forestry Commission (WEFC) to study the matter and report back to the Village Council.

The WEFC began studying the matter at their April 9, 2014 meeting, and has met on 4 occasions to gather, distribute, and discuss information and to formulate recommendations to the Village Council on the matter. The WEFC has reviewed a considerable amount of literature on coal tar-based sealants, and believes that the balance of evidence and studies indicate that because of the relatively high concentrations of carcinogenic and toxic PAH's, their continued use is considered detrimental to the environment.

**Recommendation:**

Review WEFC recommendations to ban coal tar-based pavement sealant products and provide policy direction:
1. Should the Village implement a ban of coal tar-based sealants as recommended by the WEFC?
2. Should staff be directed to prepare the necessary ordinances and materials to implement and enforce the ban?

**Attachments:**

Agenda Report
1. April 8, 2014 Village Council Study Session agenda materials and minutes
2. WEFC minutes, April 9, 2014, May 7, 2014, and May 14, 2014
3. PowerPoint presentation: Constituents of coal tar sealers and those PAH's that can be carcinogenic to humans and toxic to aquatic life
4. Austin, TX materials
5. Suffolk Co., NY materials
6. South Barrington, IL materials
7. Dane Co., WI materials
8. Montgomery Co., MD materials
9. 2014 USGS study
10. Flyer from local applicator

# Agenda Report

**Subject:** **Report to Winnetka Village Council on Coal Tar Sealant Materials**

Prepared By: Winnetka Environmental & Forestry Commission

Date: June 26, 2014

Ref: April 8, 2014 Council Study Session

Background

During the review of the Stormwater Master Plan and related stormwater improvement projects, a Trustee raised consideration of a ban on the use of coal tar sealants as a potential local environmental regulation. Sealants are used on asphalt driveways and parking lots as a means of protecting the asphalt surface from weathering. Generally, sealcoats come in two basic varieties: coal tar-based and asphalt-based. Coal tar-based sealants are more resilient, but contain much higher levels of a class of chemical compounds known as polycyclic aromatic hydrocarbons (PAH), some of which can harm fish, and with prolonged exposure, pose a risk of cancer in humans. The asphalt based products contain significantly less PAH's than coal tar-based sealants. An Austin, Texas study determined that sealcoat products based in coal tar contained up to 1,000 times more PAH's than asphalt-based products.

Coal tar is a waste material generated in the conversion of coal to coke. Manufacturers choose coal tar for sealants because of its resistance to petroleum products like gasoline and oil, which drip from cars and deteriorate asphalt surfaces. In time, sunlight and vehicle traffic wears down sealcoating, and sealcoat flakes are washed away by rain or carried away by wind.

The Village Council reviewed information and research provided by staff on the nature and use of coal tar at the April 8, 2014 Study Session, where the Council ultimately directed the Winnetka Environmental & Forestry Commission (WEFC) to study the matter and report back to the Village Council. Agenda materials and minutes for the April 8, 2014 Study Session are contained in **Attachment #1**.

The WEFC discussed the matter at their April 9, May 7, and May 14 meetings. The meetings are summarized below, and minutes of these meetings are contained in **Attachment #2**.

Environmental & Forestry Commission Analysis

The WEFC began studying the matter at their April 9, 2014 meeting, and has met on 4 occasions to gather, distribute, and discuss information and to formulate recommendations to the Village Council on the matter. WEFC members were given assignments to research actions taken by other jurisdictions in prohibiting the use of coal tar-based sealants, and to report back to the WEFC at their May 7, 2014 meeting.

At the May 7, 2014 meeting, WEFC members reported their research results to the group. Reports included a description of constituents of coal tar, the role of polycyclic aromatic hydrocarbons (or PAH's), and aspects of coal tar-based sealers (**Attachment #3**), as well as reports of how the following jurisdictions manage coal tar-based sealers:

- Austin, TX. Passed coal tar ban January of 2006. Ban in place targets commercial and industrial areas and parking lots. Inspectors will respond to residential areas if there is a complaint. There is no permit required but the enforcement ordinance is supported by fines. In the last five years, 3 cases of noncompliance violation resulted in court action. See **Attachment #4**
- Suffolk County, NY. Passed coal tar ban November 2011. Enforcement is supported by fines. Effective January 1, 2012, a $500 fine would be imposed for an initial violation and a $700 fine for each subsequent violation. See **Attachment #5**
- South Barrington, IL. Passed coal tar ban April 2012. Driveway improvements require a permit and inspection. Enforcement is primarily educational but regulations and fines are in place. There have been no tickets or fines levied. See **Attachment #6**
- Dane County, WI. Passed coal tar ban at the county level in 2007. Fines are levied for violation. Homeowners are fined $100 per occurrence. Applicators are fined $500 for the first offence $1000 for the second and $2000 for each additional offence. Warning letters are provided to suppliers and informational signs posted at stores as educational tools. See **Attachment #7** for a summary of interaction, example letters and flyers, the ordinance, summary of enforcement history, web site URL, and contacts.
- Des Plaines, IL. An ordinance was drafted but not passed due to the perceived difficulty of enforcement and monitoring.
- Montgomery County, MD. Passed coal tar ban effective December 2012. The ban mirrored a ban passed for implementation in the District of Columbia in July 2009. Enforcement is supported by pavement scrapings and if in violation, fines up to $1000 are implemented. Only a handful of fines have been levied since implementation. The county also supports education in the form of educational letters, posters, web site, social media and a phone number for residents to report possible violations. Informational/educational letters are sent to contractors, property managers and community representatives. See **Attachment #8** for ordinance, example letters, URL for website, etc.

All communities that were studied favored support of regulation and enforcement through effective education. Benefits and drawbacks of various education, enforcement, and permitting mechanisms were discussed and reviewed. The WEFC scheduled a Special Meeting for May 14, 2014 to continue the discussion.

At the May 14, 2014 Special Meeting, the WEFC reviewed the results of their research and discussed policy recommendations on issues such as education, enforcement, fines, and permits. The WEFC developed concurrence that a ban on coal tar should be

recommended to the Village Council. Further, the WEFC concurred that the enforcement mechanism should be through a combination of fines, a permitting process, material testing, and education. Staff was directed to draft a report to the Village Council for final concurrence by the WEFC.

At the June 25, 2014 meeting, the WEFC reviewed the draft report and made some minor amendments, reaching concurrence that the amended report reflects the consensus of the group to propose banning the use of coal tar-based sealant products.

Proposed Regulation of Coal Tar-based Sealants.

The WEFC has reviewed a considerable amount of literature on coal tar-based sealants, and believes that the balance of evidence and studies indicate that because of the relatively high concentrations of carcinogenic and toxic polycyclic aromatic hydrocarbons, or PAH's, their continued use is considered detrimental to the environment. As sealants wear and weather, flakes become dislodged from the surface and are carried away by stormwater runoff or by the wind. Many of the PAH's are a known human carcinogen under prolonged exposure, and runoff containing PAH's has been shown to have detrimental effects on aquatic life. **Attachment #3** is a PowerPoint summarizing the issue and examples of the carcinogenic and toxic PAH's. A recent United State Geologic Survey study demonstrating how PAH'S are transported to waterways and summarizing other recent studies is shown in **Attachment #9.**

As an alternative to coal tar-based sealers, asphalt-based sealers contain much lower concentrations of PAH's. Asphalt-based sealers are not as resistant to fuel spills, and are more sensitive to lower temperatures during application. These alternative sealants are available at local hardware stores and are also available from local applicators. One of the WEFC members received a flyer from a local applicator **(Attachment #10).** Upon discussion, the applicator indicated that a non-coal tar based sealant was available for an additional 10 to15% of a $200 to $300 application. Because asphalt-based sealers are an effective alternative to coal tar-based sealers, and because coal tar-based sealers have been found to be environmentally detrimental, the WEFC recommends that the Village Council consider banning the use of coal tar-based sealers in the Village of Winnetka. The WEFC recommends implementing the ban using the following strategies:

Regulation and Registration.

To provide for registration of commercial driveway sealant application contractors, add the following chapter to Title 5 of the Winnetka Village Code (Business Licenses and Regulations)

*"5.74. Pavement Sealant Applicators.*

*A. License. No person shall apply coal tar containing pavement or pavement sealing products to any public or private property within the Village without a license, except that a property owner applying pavement sealer or pavement products to pavement on a single-family lot under their ownership shall not require a license. Application for such*

*license shall state the name, address, and contact information of the applicator, and such other information as may be required by the Village Manager.*

*B. License Requirements. Any person requesting licensure as a Pavement Sealant Applicator shall sign an agreement not to apply products with coal tar, coal tar derivative or coal tar mixtures, and upon request by the Village shall provide a list of locations where pavement sealing services were performed within the Village of Winnetka within the preceding 12 calendar months."*

Education.
The WEFC proposes to develop a page on the Village's website with a similar format to those jurisdictions that have banned coal tar-based sealants. The WEFC recommends that letters be sent to local applicators informing them of the Village's ban on coal tar-based sealants. In a format similar to that used by other jurisdictions, letters will also be sent to all residents informing of the same. The WEFC also recommendeds articles in the Winnetka Report and e-Winnetka informing readers of the ban and the fines and procedures.

Enforcement.
The WEFC proposes that the ban be enforced by presentation, by applicators, of their license. Applicators found to be working without a license will be issued a citation. From the contractors' lists of driveways with sealant applications, the Village may choose driveways at random in the fall for testing. Samples will be sent to an independent laboratory for testing. If tests return a positive for presence of coal tar, more substantial citations, or forfeiture of licensing, can be applied.

**Recommendation:**
Review WEFC recommendations to ban coal tar-based pavement sealant products and provide policy direction:

1. Should the Village implement a ban of coal tar-based sealants as recommended by the WEFC?
2. Should staff be directed to prepare the necessary ordinances and materials to implement and enforce the ban?

**Attachments:**
1. April 8, 2014 Village Council Study Session agenda materials and minutes
2. WEFC minutes, April 9, 2014, May 7, 2014, and May 14, 2014
3. PowerPoint presentation: Constituents of coal tar sealers and those PAH's that can be carcinogenic to humans and toxic to aquatic life
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5. Suffolk Co., NY materials
6. South Barrington, IL materials
7. Dane Co., WI materials
8. Montgomery Co., MD materials
9. 2014 USGS study
10. Flyer from local applicator

**ATTACHMENT #1**

# Agenda Item Executive Summary

**Title:** Coal Tar Policy

**Presenter:** Robert M. Bahan, Village Manager

**Agenda Date:** 04/08/2014

**Consent:** ☐ YES ☑ NO

☐ Ordinance
☐ Resolution
☐ Bid Authorization/Award
☑ Policy Direction
☐ Informational Only

**Item History:**

None.

**Executive Summary:**

During review of the Stormwater Master Plan, a Trustee raised consideration of a ban on the use of coal tar-based sealants as a potential local environmental regulation. As a result, Staff has conducted preliminary research on the nature of coal tar as well as local, county and state government bans on the use of the product.

The Village does not use coal tar sealcoats on any of the asphalt surfaces it maintains. Further, local home improvement stores (Home Depot and Lowe's) no longer carry coal tar-based sealants. Research only found one community in Illinois that has a ban on coal tar: the Village of South Barrington. Restrictions and/or bans are also not prominent nationally, possibly due to some practical difficulties Staff research uncovered in both regulation processes and enforcement. The agenda report that follows outlines the research conducted to-date as well as some considerations for either regulation or educational opportunities.

Staff seeks policy direction on a coal tar policy from the Village Council.

**Recommendation / Suggested Action:**

- Should the Village pursue regulation of the use of coal tar-based sealants?
- If so: 1) Should permitting or licensing be further investigated as the regulatory mechanism?
  2) What additional information would the Council like to review?
- Does the Council wish to develop educational materials about the environmental hazards of PAHs?
- Should the matter be referred to the EFC for further study and to make recommendations to the Council?

**Attachments:**

1) Agenda Report
2) City of Des Plaines proposed coal tar ordinance
3) Chicago Tribune article on coal tar industry
4) Minnesota Pollution Control Agency coal tar information
5) City of Chicago proposed coal tar sealant amendment
6) McHenry County model coal tar sealant ordinance
7) Village of South Barrington coal tar product ban

# AGENDA REPORT

TO: Village Council

PREPARED BY: Robert M. Bahan, Village Manager
Megan E. Pierce, Assistant to the Village Manager

DATE: April 2, 2014

SUBJECT: Coal Tar Policy

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## Background

During the review of the Stormwater Master Plan and related stormwater improvement projects, a Trustee raised consideration of a ban on the use of coal tar sealants as a potential local environmental regulation. As a result, Staff has conducted preliminary research on the nature of coal tar as well as on local, county and state governments that have considered or passed bans on the use of this product.

Sealants are used on asphalt driveways and parking lots as a means of protecting the asphalt surface from weathering. Generally, sealcoats come in two basic varieties: coal tar-based and asphalt-based. Coal tar-based sealants are more resilient, but contain much higher levels of a class of chemical compounds known as polycyclic aromatic hydrocarbons (PAH), which can harm fish, and with prolonged exposure, pose a risk of cancer in humans. The asphalt based products contain significantly less PAH's than coal tar-based sealants. An Austin, Texas study determined that sealcoat products based in coal tar contained up to 1,000 times more PAH's than asphalt-based products.

Coal tar is a waste material generated in the conversion of coal to coke. Manufacturers choose coal tar for sealants because of its resistance to petroleum products like gasoline and oil, which drip from cars and deteriorate asphalt surfaces. In time, sunlight and vehicle traffic wears down sealcoating, and sealcoat flakes are washed away by rain or carried away by wind.

## Research

The Village of Winnetka does not use coal tar sealants on any of the asphalt surfaces it maintains. Further, we have learned that the larger, local home improvement stores, such as Home Depot and Lowe's, no longer carry coal tar-based sealants. However, it is unknown what type of sealant is used by commercial vendors that specialize in providing sealcoating services to local residents.

Attached to this agenda report, please find the research conducted to-date, including:

- Agenda materials from the City of Des Plaines, Illinois, including a proposed ordinance banning the sale or use of coal tar-based asphalt sealants and related information compiled by their staff. Our review of meeting agendas and minutes indicates that Des Plaines did not approve the ordinance.

- A Chicago Tribune article drawing on the Des Plaines process and the coal tar industry.

- Summary information from the Minnesota Pollution Control Agency listing governments that have taken actions to restrict or discontinue the use of coal tar-based sealants in the United States, and a fact sheet from the same agency stating environmental concerns about the use of coal tar-based sealants.

- A proposed amendment to Chapter 7-28 of Municipal Code of the City of Chicago, Illinois, prohibiting the sale and use of coal tar sealants. To our knowledge, this amendment has not been approved.

- Information from the County of McHenry, Illinois, regarding a model ordinance on coal tar sealants.

- An ordinance from Village of South Barrington, Illinois, banning the use of coal tar sealcoating products in the Village.

While some governmental units in Illinois, such as the Villages of Lake in the Hills and Spring Grove, and the Counties of DuPage (Salt Creek Watershed) and McHenry, have prohibited use of coal tar-based sealants at government facilities, the only ban in Illinois our research revealed was implemented by South Barrington in 2012. Outside of Illinois, the only governments found with either some restrictions or a ban include: Austin, Texas; Washington, D.C.; the State of Washington; the State of Minnesota; Dane County, Wisconsin; Montgomery County, Maryland; and Suffolk County, New York.

**Policy Considerations**

As the Council reviews the background and research, there are some regulatory considerations to assess.

The threshold decision is to determine how much regulation the Village wishes to impose to assure the effectiveness of a ban. In general, the regulatory framework would consist of any one or more of the following components: permits, licenses, inspections and citations for violations. As the following discussion indicates, each method brings some administrative challenge. Even though there are 7 PAHs that are probable human carcinogens and there are potential negative environmental/water quality impacts related to coal tar, it may well be that the challenge of effectively regulating and enforcing a coal tar ban has prevented many jurisdictions from approaching the issue.

Permit regulation would require a property owner to seek a permit prior to doing the work, whether they are doing the sealcoating themselves or are hiring a service. To issue

a permit, the Village would need to determine how to verify that the applicant would not use a coal tar-based product.

On the other hand, licensing of service providers would involve developing a list of the companies that perform sealcoating locally, and then creating a licensing process before they would be allowed to perform work in the Village. The Village does not currently require any such licensing of any types of contractors. Compliance in the course of the work would also require inspections, as is done with building construction.

Both permitting and licensing would also need to be supported by an enforcement mechanism to ensure that only permitted products are used and to determine violations. Enforcement would be done by either Community Development or the Police Department. However, while it is easy to observe sealcoating, there is no quick way to definitively determine whether someone is using an asphalt or coal tar-based product, unless one has a material safety data sheet for the actual product. Even if a ban is implemented without a permit mechanism and violations are purely complaint driven, as in the case of South Barrington, there are no field testing kits available for use in enforcement. Therefore, like a complainant, the enforcement officers would have no way to know – or prove – if a violation has occurred. In addition, in the time it takes to respond and act upon the complaint, sealcoating work might already be underway and, once it has been applied, the sealcoat cannot be removed.

Thus, permitting, licensing, inspections and enforcement would each involve additional staff time. Any new regulation with such widespread potential impact would need to be broadly communicated to the community before it goes into effect.

There is, however, an opportunity to pursue an educational rather than regulatory path, focusing on developing information and communications that offer alternatives to coal tar sealants. Since coal tar-based products are not readily available in the area, property owners doing the sealcoating themselves are not a high concern. However, property owners may unintentionally hire a service that uses these products, and that information is not likely provided by the contractor. With the assistance of those more knowledgeable about environmental concerns, such as the Environmental & Forestry Commission (EFC), educational materials could be developed and communicated to property owners, to help residents select products and services that are not harmful to the environment. Staff believes this could also be part of a larger communication initiative that would identify other local environmental concerns such as the use of fertilizers, picking up after pets, etc., that also impact water quality and pollution in stormwater runoff.

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**Recommendation**

Staff seeks policy direction from the Village Council on the following items:

- Should the Village pursue regulation of the use of coal tar-based sealants?
- If yes:
    - Should permitting or licensing be further investigated as the regulatory mechanism?
    - What additional information would the Council like to more fully understand the issues and the complexity of enforcement?
- Does the Council wish to pursue development of educational materials about the health risks and environmental hazards of PAHs, as found in coal tar-based sealants?
- Should the matter be referred to the Environmental & Forestry Commission for further study, with recommendations provided directly back to the Village Council?

Attachment #2

**Committee of the Whole Item #3a**

DES PLAINES
ILLINOIS

**City of Des Plaines**
**City Manager's Office**
1420 Miner Street
Des Plaines, IL 60016
Tel: 847-391-5488
Fax: 847-391-5451

## MEMORANDUM

Date: March 9, 2011

To: Mayor and Aldermen of the City Council

From: Jason T. Slowinski, Acting City Manager

Subject: Ordinance Banning Sale or Use of Coal Tar Based Asphalt Sealants

**Issue:** The Public Safety Committee requested that Staff present information to the Committee on coal tar based asphalt sealants and their health impacts. On February 22, 2011, the Public Safety Committee met to consider the issue and recommended 2-0 (1 absent) that Staff draft an ordinance banning the use or sale of coal tar based sealants in the City of Des Plaines and present the ordinance to the City Council in Committee of the Whole for consideration.

**Analysis:** Coal tar based sealants are used on asphalt driveways and parking lots as a means to protect the asphalt surface from weathering. They contain a chemical compound that is recognized as a potential carcinogen. The staff report sent to the Committee dated February 18th is attached for your review and contains additional information from the U.S. Department of Health and Human Services and the United States Geological Survey regarding coal tar based sealants and its effect on humans.

Staff conducted some additional research at the request of the Committee whether the Environmental Protection Agency (EPA) has taken an official position on coal tar based sealants. It has been reported that the EPA has initiated a study in late 2009 and the report from that study is still pending. To date, the EPA has not banned the use of coal tar sealants.

The Committee also inquired into the difference in cost and performance between coal tar based sealants and asphalt based sealants. Essentially, the cost of the two products is the same; however, the cost of petroleum based sealants will vary with the cost of oil. Regarding performance between the two products, contractors have reported that the life of a coal-tar sealant application is approximately four years while a petroleum based sealant application is approximately one year. Please see the attached letter from an area contractor, Pavement Systems, Inc.

Staff has also attached for your review a recent article published in the *Chicago Tribune* discussing the safety of coal tar sealants.

Finally, as a result of articles generated in the local press regarding the Committee's review of this issue, Staff was contacted by Anne LeHuray, Executive Director of the Pavement Coatings Technology Council—the trade organization representing manufacturers and supplies of asphalt

sealers. Ms. LeHuray has submitted a letter, which is attached for your review, requesting that this matter be tabled until she can be present to make a presentation to the City Council.

Generally, environmental policy is established at the federal and state levels, although there is recent evidence that some local jurisdictions around the country have adopted local measures banning the sale or use of coal tar based sealants. Since the EPA has not banned the use of coal tar based sealants and Staff does not have the adequate expertise to develop environmental policy, this item is being forwarded to the City Council with a neutral Staff recommendation. It has received a recommendation of approval from the Public Safety Committee.

**Recommendation:** This item is presented to the Council with a recommendation for approval from the Public Safety Committee.

Attachments:
February 22, 2011 Staff Report
Letter from Pavement Systems, Inc.
January 18, 2011 Chicago Tribune article
Letter from Anne LeHuray, Pavement Coatings Technology Council
Ordinance

DES PLAINES
ILLINOIS

**City of Des Plaines**
**City Manager's Office**
1420 Miner Street
Des Plaines, IL 60016
Tel: 847-391-5488
Fax: 847-391-5451

## MEMORANDUM

Date: February 18, 2011

To: Public Safety Committee

From: Jason T. Slowinski, Acting City Manager

Subject: Discussion of Ban on Coal Tar Sealant

**Issue:** The Chairman of the Public Safety Committee requested that the Committee discuss whether a local ordinance should be passed that would ban the use or sale of coal tar sealant in the City of Des Plaines.

**Analysis:** Sealants are typically used on asphalt parking lots and driveways as a means to protect the asphalt surface from elements thereby prolonging the life of the asphalt. Some sealants are coal tar based, which are known to consist of a chemical compound known as polycyclic aromatic hydrocarbons (PAH). The U.S. Department of Health & Human Services recognizes that some PAHs have been known to cause cancer.

Several cities have passed local ordinances that ban the sale or use of coal tar asphalt sealants within the local jurisdiction. The City of Austin, Texas is the largest recognized city to have enacted a similar ban.

Staff has attached reports from the U.S. Department of Health and Human Services as well as the U.S. Geological Survey (Department of the Interior) that provides additional background information on PAHs and parking lot sealants. In addition, Staff has attached an ordinance from a Minnesota municipality that has banned the use or sale of coal tar sealants for your consideration.

**Recommendation:** This is presented to the Committee as an item for discussion an, as such, no recommendation is being made at this time.

w/ Attachments: Report: Polycyclic Aromatic Hydrocarbons (USDHHS)
Report: Parking Lot Sealcoat (USGS)
Model Ordinance—City of White Bear Lake

cc: Tim Oakley, Director of Public Works and Engineering
David Wiltse, City Attorney

Attachment 1

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

# POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Agency for Toxic Substances and Disease Registry ToxFAQs September 1996

**This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.**

**SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).**

## What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl'ĭ-sī'klĭk ăr'ə-măt'ĭk hī'drə-kar'bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

## What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

## How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.

- Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

## How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

## How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

## Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

## Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 $mg/m^3$). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 $mg/m^3$ averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 $mg/m^3$ for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

## Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

## References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Prepared in cooperation with the City of Austin, Texas

# Parking Lot Sealcoat: A Major Source of Polycyclic Aromatic Hydrocarbons (PAHs) in Urban and Suburban Environments

By Peter C. Van Metre[1], Barbara J. Mahler[1], Mateo Scoggins[2], and Pixie A. Hamilton[1]

Collaborative studies by the City of Austin and the U. S. Geological Survey (USGS) have identified coal-tar based sealcoat—the black, shiny emulsion painted or sprayed on asphalt pavement such as parking lots—as a major and previously unrecognized source of polycyclic aromatic hydrocarbon (PAH) contamination. Several PAHs are suspected human carcinogens and are toxic to aquatic life. Studies in Austin, Texas, showed that particles in runoff from coal tar based sealcoated parking lots had concentrations of PAHs that were about 65 times higher than concentrations in particles washed off parking lots that had not been sealcoated. Biological studies, conducted by the City of Austin in the field and in the laboratory, indicated that PAH levels in sediment contaminated with abraded sealcoat were toxic to aquatic life and were degrading aquatic communities, as indicated by loss of species and decreased numbers of organisms. Identification of this source of PAHs may help to improve future strategies for controlling these compounds in urban water bodies across the Nation where parking lot sealcoat is used.

Particles in runoff from coal-tar based sealcoated parking lots had concentrations of PAHs that are about 65 times higher than concentrations in particles washed off parking lots that had not been sealcoated.

## What are PAHs, coal tar, and sealcoat?

Polycyclic aromatic hydrocarbons (or PAHs) are a group of organic contaminants that form from the incomplete combustion of hydrocarbons, such as coal and gasoline. PAHs are an environmental concern because they are toxic to aquatic life and because several are suspected human carcinogens.

Coal tar is a byproduct of the coking of coal, and can contain 50 percent or more PAHs by weight.

Sealcoat is a black liquid that is sprayed or painted on asphalt pavement in an effort to protect and beautify the asphalt. Most sealcoat products are coal-tar or asphalt based. Many coal-tar sealcoat products contain as much as 30 percent coal tar by weight. Product analyses by the City of Austin indicated that coal-tar sealcoat products have median concentrations of total PAHs about 70 times higher than concentrations in asphalt-based sealcoat products.

Sealcoat is used commercially and by homeowners across the Nation. It is applied to residential driveways and to parking lots associated with commercial businesses (including strip malls and shopping centers), apartment and condominium complexes, churches, schools, and business parks. The City of Austin, Texas, estimates that about 600,000 gallons of sealcoat are applied every year in the greater Austin area. National use numbers are not available, but commercial availability suggests that asphalt-based sealcoat is commonly used on the West Coast and coal-tar based sealcoat is commonly used in the Midwest, the South, and on the East Coast.

## How did USGS study parking lot runoff?

USGS researchers sampled runoff at 13 parking lots in Austin. They also took scraping samples of parking lot surfaces to compare source materials to particles in the runoff. Scraping samples and the water and particles in the runoff samples were analyzed for a suite of PAHs, major elements, and trace elements. The researchers sprayed water on four different types of parking lot surfaces: lots sealed with coal-tar based sealcoat (top photo), lots sealed with asphalt-based sealcoat, unsealed asphalt lots, and unsealed concrete lots. The runoff was collected behind spill berms, pumped into containers (middle photo) and filtered through Teflon filters to collect the particulates for analysis (bottom photo). The particulates, the filtered water, and samples of sealcoat scraped from the parking lot surfaces were analyzed for PAHs at the USGS National Water Quality Laboratory in Denver, Colorado. Concentrations and yields (the amount of PAHs coming off a parking lot per unit area) were used to determine levels of contamination in runoff from each type of parking lot and the importance of sealed lots as a source of PAHs to urban streams.

## How does sealcoat get from parking lots into the environment?

Vehicle tires abrade parking lot sealcoat into small particles. These small particles are washed off parking lots by precipitation and into storm sewers and streams. Sealcoat "wear and tear" is visible in high traffic areas within a few months after application. Sealcoat manufacturers recommend reapplication every 2 to 3 years.

## What are potential environmental and human-health concerns?

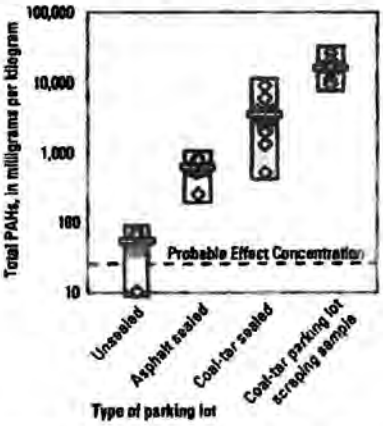
PAHs are toxic to mammals (including humans), birds, fish, amphibians, invertebrates, and plants. Aquatic invertebrates, the insects and other small animals that live in streams and lakes, are particularly susceptible to PAH contamination, especially the bottom dwellers (benthic invertebrates) that live in the mud where PAHs tend to accumulate. They are an important part of the food chain and are often monitored as indicators of stream quality (analogous to the "canary in the coal mine" concept). Possible effects of PAHs on aquatic invertebrates include inhibited reproduction, delayed emergence, sediment avoidance, and mortality, and possible adverse effects on fish include fin erosion, liver abnormalities, cataracts, and immune system impairments. PAHs tend to attach to sediment; the Probable Effect Concentration (PEC)—a widely used sediment-quality guideline that is the concentration of a contaminant in bed sediment expected to adversely affect benthic (or bottom-dwelling) biota—is 22.8 mg/kg (milligrams per kilogram) for total PAHs.

Studies by USGS and City of Austin did not evaluate human-health risk from exposure to sealcoat. Human-health risk from environmental contaminants is often evaluated in terms of exposure pathways. For example, people could potentially be exposed to PAHs in sealcoat through skin contact with abraded particles from parking lots, inhalation of wind-blown particles, and inhalation of fumes that volatilize from sealed parking lots. PAHs in streams and lakes rarely pose a human-health risk via drinking water because of their tendency to attach to sediment rather than dissolve in water. In addition, because PAHs do not readily bioaccumulate within the food chain, possible human-health risks associated with consumption of fish are low.

## What are the concentrations of PAHs in runoff from sealed and unsealed parking lots?

Concentrations of PAHs in particles (including abraded sealcoat along with urban dust and other sediment) washed off from each of the different surface types—including the unsealed parking lots—were greater than the PEC of 22.8 mg/kg. The average concentration in particles washed off parking lots that were not sealcoated was 54 mg/kg. This is not surprising because runoff from parking lots is likely to contain PAHs from many sources, including leaking motor oil, tire particles, vehicle exhaust, and atmospheric deposition.

Concentrations of PAHs were much higher in particles in runoff from parking lots sealed with coal-tar based sealcoat than from all other types of parking lot surfaces. Specifically, the average concentration of PAHs from coal-tar sealed lots was 3,500 mg/kg, about 65 times higher than the average concentration in particles washed off unsealed parking lots. The average concentration in par-




Concentrations of total PAHs in particles in runoff from sealed parking lots greatly exceeded concentrations from unsealed parking lots. The bar on each graph is the mean concentration. The y-axis is logarithmic.

ticles washed off parking lots sealed with asphalt-based sealcoat was 620 mg/kg, about 10 times higher than the average concentration from unsealed parking lots and 6 times less than the average concentration from coal-tar sealed lots.

The large differences between concentrations associated with sealed and unsealed parking lots indicate that abraded sealcoat is a major and previously unrecognized contributor to PAH contamination.

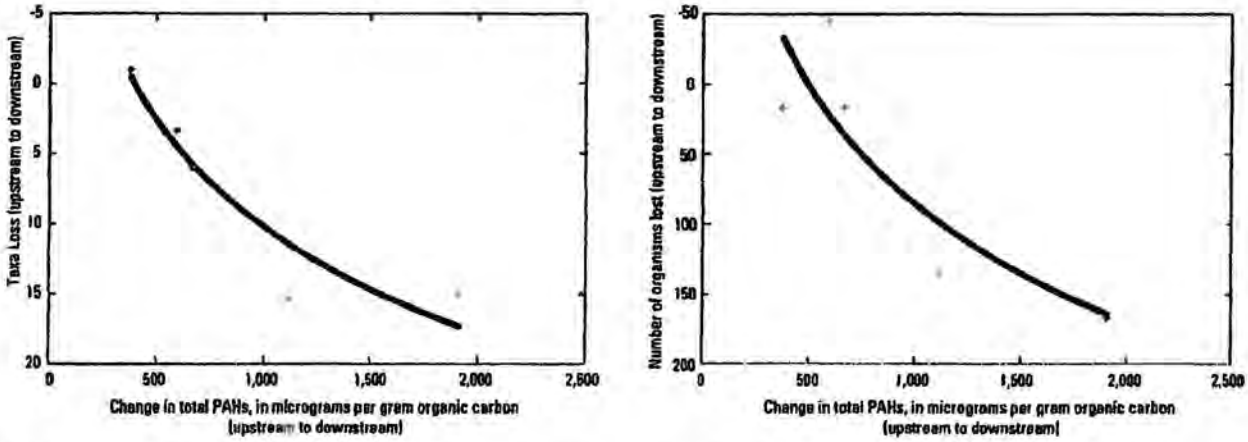
## How do PAHs from sealcoat affect the quality and biology of streams?

Studies by USGS scientists demonstrated possible connections between PAHs in particles washed off sealed parking lots and PAHs in suspended sediment in four streams in Austin and Fort Worth, Texas. The total mass of PAHs (or "load") expected to wash off sealed parking lots was compared to the load of PAHs measured in suspended sediment in the four streams after rainstorms. The load of PAHs estimated to come from the sealed parking lots was comparable to the measured load in the streams, indicating that runoff from sealed parking lots could account for the majority of PAHs in these streams. Findings also showed that PAHs in suspended sediment in the streams were chemically similar to those in particles washed off parking lots sealed with coal-tar based sealcoat. What would be the effect on PAH loading to the streams if parking lots were not sealed? Estimates from the USGS study indicate that total loads of PAHs coming from parking lots in the studied watersheds would be reduced to about one-tenth of their current levels if all of the parking lots were unsealed.

Studies by City of Austin biologists showed that PAHs in sediment contaminated with abraded sealcoat could be adversely affecting aquatic communities. Specifically, toxicity testing of organisms in the laboratory showed large increases in mortality as sealcoat amounts and PAH concentrations were increased, and that sediment contaminated with coal-tar sealcoat was toxic to aquatic life at PAH concentrations observed in Austin waterways. Controlled experiments that used aquariums with diverse natural biological communities showed significant biological degradation in response to the addition of sealcoat particles. Finally, field assessments in selected Austin streams showed loss of species and decreases in the number of aquatic organisms downstream from inflows of runoff from coal-tar sealcoated parking lots. These effects coincided with increases in concentrations of PAHs in stream sediment below sealcoated parking lots. Overall, City of Austin scientists have reported PAH contamination at levels predicted to be toxic to benthic invertebrates in about 13 percent of sampled Austin creeks.

## How did City of Austin scientists conduct biological studies?

City of Austin biologists conducted laboratory and field studies to evaluate the effects of sealcoated parking lots on aquatic communities in area streams. These studies included toxicity testing in controlled laboratory experiments that exposed organisms to sediment spiked with coal-tar and asphalt-based sealcoat (left photo); controlled experiments that used aquariums with diverse natural biological communities to which sealcoat was added (middle photo); and field assessments of aquatic communities in streams upstream and downstream from inflows of runoff from sealcoated parking lots (right photo).




Field assessments in five selected Austin streams showed loss of species (taxa) and decreases in the number of aquatic organisms downstream of coal-tar sealcoated parking lots that can be, in large part, explained by increases in total PAHs.

## How do these findings apply to urban lakes and reservoirs?

The concentrations of PAHs in lakes and reservoirs across the Nation are increasing, as indicated by USGS studies of 38 reservoirs and lakes conducted in 18 metropolitan areas across the country (Van Metre and Mahler, 2005). Sediment cores (vertical tubes of mud) were collected from reservoir and lake bottoms (see photo below); analysis of these cores provides a reconstruction of historical water quality over time, much like using tree rings to reconstruct historical climate. Runoff carries soil, debris, and attached contaminants to lakes and reservoirs, which settle to the bottom; as the sediment builds up, changes in water quality are recorded in the successive sediment layers.

USGS findings show that concentrations of total PAHs in the majority of lakes and reservoirs in urban and suburban areas across the Nation increased significantly from 1970 to 2001. The increases were greatest in lakes with rapidly urbanizing watersheds (urban sprawl); for example, over the last 10 years, the concentrations of PAHs in Lake in the Hills (suburban Chicago, Illinois) increased ten-fold as the watershed was rapidly developed. Further study is needed to assess direct links between the use of sealcoat and PAH trends in these urban lakes and reservoirs across the Nation.

## What are the implications of these studies?

The study of parking lot surfaces by the USGS and the City of Austin show that abraded sealcoat could be a major source of PAHs to urban and suburban water bodies in watersheds across the Nation where sealcoat is used. Such findings have implications that extend beyond Texas as sealcoat is used nationwide; further studies would help to evaluate the potential impacts of sealcoat on the aquatic environment in other parts of the country. Identification of this source may influence future strategies for controlling PAHs in urban environments. In the past, sources of PAHs in urban watersheds were thought to be dominated by numerous nonpoint sources, such as leaking motor oil, tire wear, vehicular exhaust, and atmospheric deposition. Such sources are difficult to quantify or control because of their diffuse nature. In contrast, sealcoated parking lots are specific areas that contribute directly to urban stormwater runoff (see photo below), and the use of sealcoat is voluntary and controllable. To address PAH contamination in streams, the City of Austin Council banned the use of coal-tar based sealcoat, effective January 2006 (Nancy McClintock, written communication, City of Austin, November 2005).

Possible alternatives to coal-tar based sealcoating of parking lots and driveways include the use of concrete and unsealed asphalt pavement, and the use of asphalt-based sealcoat that contains lower levels of PAHs.

Currently, the use of coal-tar based sealcoat is not federally regulated. In 1992, the U.S. Environmental Protection Agency excluded coke product residues, including coal tar, from classification as hazardous wastes if they are recycled. Under the Resource Conservation and Recovery Act, coal-tar based pavement sealants are products that contain recycled coal tar and, therefore, are not regulated.

## Contacts for additional information

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Watershed Protection and Development Review Department
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Austin, Texas 78704
(512) 974-1917 or
mateo.scoggins@ci.austin.tx.us

## Links to related publications, data and maps

**City of Austin Coal Tar Sealant Information–**
*http://www.ci.austin.tx.us/watershed/hs_coaltar.htm*

**USGS frequently asked questions–**
*http://water.usgs.gov/nawqa/asphalt_sealers.html*

**Basic information on the toxicity of PAHs to biological organisms, U.S. Environmental Protection Agency (USEPA)–**
*http://www.epa.gov/R5Super/ecology/html/toxprofiles.htm#pahs*

**General information on PAH exposure, Agency for Toxic Substances and Disease Registry (ATSDR)–**
*http://www.atsdr.cdc.gov/toxprofiles/phs69.html*

## References

Mahler, B.J., Van Metre, P.C., Bashara, T.J., Wilson, J.T., and Johns, D.A., 2005. Parking lot sealcoat: An unrecognized source of urban PAHs: Environmental Science and Technology, vol. 39, no. 15, p. 5560-5566.

Van Metre, P.C. and Mahler, B.J., 2005. Trends in hydrophobic organic contaminants in urban and reference lake sediments across the United States, 1970-2001: Environmental Science and Technology, vol. 39, no. 15, p. 5567-5574.

City of Austin. 2005. PAHs in Austin, Texas. (*http://www.ci.austin.tx.us/watershed/downloads/coaltar_draft_pah_study.pdf*)

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[1] U.S. Geological Survey
[2] City of Austin

## V. PROHIBITING THE USE AND SALE OF COAL TAR-BASED SEALANTS

### §511.101. PURPOSE.

The City of White Bear Lake highly values lakes, rivers, streams and other bodies of water as natural assets which enhance the environmental, recreational, cultural and economic resources and contribute to the general health and welfare of the community.

The use of sealers on asphalt surfaces is a common maintenance practice. However, scientific studies on the use of pavement sealers have demonstrated a relationship between stormwater runoff and certain health and environmental conditions, including the presence of Polycyclic Aromatic Hydrocarbons, a known carcinogen.

The purpose of this ordinance is to regulate the use of sealer products within the City of White Bear Lake, in order to protect, restore, and preserve the quality of its waters. Further, it is the purpose of this ordinance to enhance compliance with the application prohibition through regulating sale of certain products.

### §501.020. DEFINITIONS.

Except as may otherwise be provided or clearly implied by context, all terms shall be given their commonly accepted definitions. For the purpose of this ordinance, the following definitions shall apply unless the context clear indicates or requires a different meaning:

***ASPHALT-BASED SEALER***. A petroleum-based sealer material that is commonly used on driveways, parking lots, and other surfaces and which does not contain coal tar.

***COAL TAR***. A byproduct of the process used to refine coal.

***COAL TAR-BASED SEALER***. A sealer material containing coal tar and is for use on an asphalt or concrete surface, including a driveway or parking area.

***CITY***. The City of White Bear Lake.

***PAHs***. Polycyclic Aromatic Hydrocarbons. A group of organic chemicals formed during the incomplete burning of coal, oil, gas, or other organic substances. Present in coal tar and believed harmful to humans, fish, and other aquatic life.

## §511.030. USE OF COAL TAR-BASED SEALER PROHIBITED.

Subd. 1. No person shall apply any coal tar-based sealer to any driveway, parking lot, or other surface within the City of White Bear Lake.

Subd. 2. No person shall contract with any commercial sealer product applicator, residential or commercial developer, or any other person for the application of any coal tar-based sealer to any driveway, parking lot, or other surface within the City.

Subd. 3. No commercial sealer product applicator, residential or commercial developer, or other similar individual or organization shall direct any employee, independent contractor, volunteer, or other person to apply any coal tar-based sealer to any driveway, parking lot, or other surface within the City. A person who owns property on which a coal tar-based sealer is used is presumed to have used a coal tar-based saler in violation of this section.

## §511.040. SALE OF COAL TAR-BASED SEALER RESTRICTED

Subd. 1. A person may not sell a coal tar-based sealer product within the City, unless:

a) The sale is to a person who intends to use the coal tar-based sealer outside the City's planning jurisdiction; and
b) The seller requires the purchaser to complete and sign a form provided by the City that includes:

    1. The name, address, and phone number of the purchase,
    2. The date of the purchase,
    3. The quantity of coal tar-based sealer purchased,
    4. A statement that the coal tar-based sealer will not be used within the City of White Bear Lake, and
    5. An affirmation by the purchaser that the information on the form is correct, and
    6. The seller retains the completed form for a period of not less than two years and allows the City to inspect or copy of the form upon request.

## §511.050. ASPHALT-BASED SEALCOAT PRODUCTS.

The provisions of this ordinance shall only apply to use of coal tar-based sealer in the City and shall not affect the use or sale of asphalt-based sealer products within the City.

**§511.060. PENALTY.**

Any person convicted of violating any provision of this ordinance is guilty of a misdemeanor and shall be punished by a fine not to exceed one thousand dollars ($1,000.00) or imprisonment for not more than ninety (90) days, or both, plus the costs of prosecution in either case.

**§511.070. SEVERABILITY.**

If any provision of this ordinance is found to be invalid for any reason by a court of competent jurisdiction, the validity of the remaining provisions shall not be affected. **(Ref. Ord. 10-4-1069, 4/27/10)**

The recent article in the Chicago Tribune regarding coal tar based pavement sealers has raised questions regarding its safety. After reading the article and a number of rebuttals I can only say that I am not certain what the exact truth is. Our suppliers are telling us that the product is safe to use and that the Tribune article misrepresents many of the facts about the product. Some of their arguments against the article make sense. For example the first paragraph points out that if I dumped the coal tar sealer "behind a factory" I would "violate all sorts of environmental laws and face an expensive hazardous-waste cleanup." The same is true for latex house paint that we all use in our homes on a daily basis as well as asphalt based sealers. This statement helps the article start with an impressive impact, but really doesn't tell us anything. I will not go into detail on other points of contention, but will tell you some of the things I know about the material:

I know that the polycyclic aromatic hydrocarbons in question are a byproduct of many common and every day processes such a burning fuels and gasoline. I know that the refined coal tar used to make pavement sealer is also used in many consumer products including some applied directly to our bodies such as dandruff shampoo. I know that my material suppliers have a strongly vested interest in protecting their product and that I cannot be certain their product is safe simply because they tell me so. I know that the EPA has regulated and banned other products our industry uses and I see no reason that they would not do the same with this product if they concluded it was not safe.

We have used and investigated other pavement sealers in the past and found that the durability and life-span of the coal tar based sealer is significantly superior. My brothers and I have worked directly with the coal tar sealer for 30 years and at this point we plan to continue to use it unless we receive notice from the EPA that they deem it unsafe. However, we will gladly use an asphalt based sealer at the request of any of our customers. The difference in the cost of the material is nominal, but the asphalt based sealer will be more temperature sensitive and will not last as long as the coal tar sealer.

Attached is a copy of a response to the Tribune Article written by the Pavement Coatings Technology Council. Please feel free to call me with any questions you might have.

Sincerely,

Jay Land
President
Pavement Systems, Inc.
13820 S. California Ave.
Blue Island, Illinois 60406
Phone: 708-396-8888, ext-17
Fax: 708-396-8893

Attachment 2

www.chicagotribune.com/health/ct-met-toxic-coal-tar-sealant-20110115,0,2601922.story

# chicagotribune.com

## New doubts cast on safety of common driveway sealant

### Extremely high levels of toxic chemical in coal tar found in booming suburb

By Michael Hawthorne, Tribune reporter

2:07 PM CST, January 18, 2011

If a company dumped the black goop behind a factory, it would violate all sorts of environmental laws and face an expensive hazardous-waste cleanup.

advertisement

But playgrounds, parking lots and driveways in many communities are coated every spring and summer with coal tar, a toxic byproduct of steelmaking that contains high levels of chemicals linked to cancer and other health problems.

Nearly two decades after industry pressured the U.S. Environmental Protection Agency to exempt coal tar-based pavement sealants from anti-pollution laws, a growing number of government and academic studies are questioning the safety of the widely used products. Research shows that the tar steadily wears off and crumbles into contaminated dust that is tracked into houses and washed into lakes.

In Lake in the Hills, a fast-growing McHenry County suburb about 50 miles northwest of Chicago, researchers from the U.S. Geological Survey found that driveway dust was contaminated with extremely high levels of benzo(a)pyrene, one of the most toxic chemicals in coal tar. The amount was 5,300 times higher than the level that triggers an EPA Superfund cleanup at polluted industrial sites.

High levels also were detected in dust collected from parking lots and driveways in Austin, Texas; Detroit; Minneapolis; New Haven, Conn., and suburban Washington, D.C. By contrast, dramatically lower levels were found in Portland, Ore.; Salt Lake City and Seattle, Western cities where pavement sealants tend to be made with asphalt instead of coal tar.

The findings raise new concerns about potential health threats to people and aquatic life that went undetected for years.

"This is a real eye-opener, even for scientists who work frequently with these chemicals," said Barbara Mahler, a USGS researcher involved in the studies. "Such high concentrations usually are found at Superfund sites, but this could be your church parking lot or your school playground or even your own driveway."

About 85 million gallons of coal tar-based sealants are sold in the United States each year, according to

Attachment 3

industry estimates. There are no comprehensive figures on where it is applied, but in Lake in the Hills, researchers determined that 89 percent of the driveways are covered in coal tar.

Manufacturers promote the sealants as a way to extend the life of asphalt and brighten it every few years with a fresh black sheen. Contractors spread a mixture of coal tar, water and clay using squeegee machines and spray wands, or homeowners can do it themselves with 5-gallon buckets bought at hardware stores.

The makers of coal tar sealants acknowledge that the products contain high levels of benzo(a)pyrene and other toxic chemicals known collectively as polycyclic aromatic hydrocarbons, or PAHs. But they deny their products are responsible for the chemical contamination found in government studies, saying it could be coming from vehicle exhaust or factory emissions that travel long distances and eventually settle back to earth.

As more research identifies coal tar sealants as a top source of PAH-contaminated driveway dust and lake sediment, manufacturers have started to fund their own research to question the findings. Lobbyists also are offering contractors free admission to an upcoming seminar that promises to show them ways to "protect the industry," including a promotional DVD they can use to "help market sealcoating to your customers."

"Nobody in our industry wants to hurt anybody," said Anne LeHuray, executive director of the Pavement Coatings Technology Council, an industry trade group. "The science is still evolving. If our products are a source, they are a very localized source."

The supply chain for the sealants begins at about two dozen factories, most of them around the Great Lakes or in western Pennsylvania, that bake coal into high-energy coke used in steel production. Companies figured out a century ago that much of the waste could be refined and sold to make other products, and they started adding it to pavement sealants after World War II.

One of the biggest suppliers is Koppers, a Pittsburgh-based company that processes coal tar at a plant in west suburban Stickney. The plant made about a third of the nation's refined coal tar in 2007, most of it used in aluminum production, according to an industry slide presentation. A company spokesman declined to comment.

Coal tar remains in widespread use even though its dangers have been known for centuries. During the late 1700s, many chimney sweeps exposed to tar in coal-heated London developed scrotal cancer, and decades later doctors determined that workers who coated railroad ties with tar-based creosote had high rates of skin cancer.

More recently, federal and state officials have prosecuted dozens of companies for illegally dumping coal tar and fouling neighboring areas with PAHs. At least 40 percent of the polluted industrial sites on the EPA's Superfund cleanup list have problems with PAH contamination, as do scores of other sites that haven't made the list.

Major cleanups in the Chicago area include a site in west suburban Oak Park, where a factory that turned coal into natural gas during the late 1800s dumped coal tar on property that later became a village park. Utilities spent at least $50 million digging 40 feet down into Barrie Park during the mid-2000s to haul out more than 300,000 tons of contaminated soil.

In 2007, the U.S. EPA ordered a company to dig up the yards of more than three dozen homes in Chicago's Little Village neighborhood where coal tar had oozed from an abandoned roofing plant

nearby. The agency also urged residents to prevent their children from playing in dirt around their houses and to avoid gardening.

The amount of PAHs that triggered the Oak Park and Little Village cleanups was substantially lower than what researchers found in driveway dust in Lake in the Hills — 0.3 and 10 parts per million, respectively, compared with up to 9,600 parts per million.

Despite the EPA's long-standing worries about the chemicals, industry successfully lobbied to exempt coal tar pavement sealants when the agency tightened hazardous-waste rules for coke ovens during the early 1990s. The little-noticed change made it easier for manufacturers to keep selling the products, which can contain as much as 50 percent PAHs by weight.

Agency spokesmen declined to make anyone available to discuss the exemption, but said in a statement there are no plans to revise it. "EPA regulations allow for the legitimate recycling of coal tar under certain specified parameters," the statement said.

Scientists started to track the movement of coal tar sealants into homes and lakes about a decade ago, after pinpointing the source of alarmingly high levels of PAHs in Barton Springs, a popular swimming hole in Austin, the Texas capital. Tom Bashara, an environmental investigator, noticed that pollution hotspots in a creek flowing into the pool were near parking lots coated with coal tar.

The finding led Mahler and her colleagues at a USGS center in Austin to expand the research to other communities around the nation, including Lake in the Hills, where the number of households more than quadrupled between 1990 and 2006.

Among other things, they found rising amounts of PAHs in the sediment of lakes where coal tar sealants are commonly used, but dramatically lower amounts in areas where asphalt-based sealants are preferred.

In Austin, the scientists also found that dust inside apartments next to parking lots coated with coal tar was 25 times more contaminated than the dust in units next to lots coated with asphalt or left unsealed. Young children could be the most vulnerable to exposure, the researchers concluded, because they play on or near floors where dust collects.

After industry lawyers challenged the findings, arguing that other sources were to blame, the USGS scientists published another peer-reviewed study late last year that traced the contamination back to coal tar sealants.

By analyzing several feet of sediment, they determined that concentrations in the biggest lake in Lake in the Hills, known as Woods Creek Lake, didn't begin to spike until the area was more intensely paved with parking lots and driveways in the early 1990s. They spotted similar trends in other cities, including Orlando, Fla., and suburban Washington.

"You just don't otherwise see these kinds of concentrations in a typical urban, residential environment," said Peter Van Metre, another USGS scientist working on the research.

Coal tar sealants have been banned in Austin; Dane County, Wis.; Washington, D.C., and several Minnesota cities. Home Depot and Lowe's have pulled coal tar-based sealants from their shelves, though they remain widely available elsewhere.

In Lake in the Hills, officials posted a one-page brochure at Village Hall outlining the difference between coal tar- and asphalt-based sealants. The village stopped using coal tar sealants on its own

property but declined to ban them outright.

"We've already solved the problem," said Gerald Sagona, the village administrator.

PAHs are of particular concern because they don't break down easily. The USGS found that although concentrations of banned chemicals like DDT and PCBs are slowly declining in the environment, levels of PAHs are increasing.

"There is a very clear connection between the use of these sealants and high levels of contamination downstream," said Alison Watts, a University of New Hampshire researcher whose own studies tracked PAH-contaminated runoff from parking lots. "The problem isn't going to go away if you keep putting this stuff down every three years."

*mhawthorne@tribune.com*

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**Jason Slowinski**

**From:** alehuray [alehuray@pavementcouncil.org]
**Sent:** Monday, March 14, 2011 3:40 PM
**To:** Jason Slowinski
**Subject:** Pavement Coatings Technology Council

**Importance:** High

Jason Slowinski
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jslowinski@desplaines.org
(847) 391-5300

Dear Mr. Slowinski -

Thank you again for returning my phone call last week. I am the Executive Director of the Pavement Coatings Technology Council (PCTC), a trade assocation with member companies involved in manufacturing pavement sealer materials. A web-based media monitoring system alerted PCTC that the City of Des Plaines is considering an ordinance concerning the use of refined tar-based sealers on paved surfaces in Des Plaines. Based on our telephone conversation, it is my understanding that the City Council is planning to consider the issue at a meeting on the evening of Monday March 21, and Ms. Mendoza called last Thursday to ask that PCTC's comments or other submissions be made by today, Monday March 14. Since we spoke last week, I have visited and searched the City's web site (http://www.desplaines.org) several times (most recently, just a minute ago) in hopes that an agenda for the March 21 meeting or the minutes of a previous meeting or a draft resolution or ordinance would be posted that would help me understand and appropriately address the City's concerns. Unfortunately, I'm unable to find any reference at all on the City's web site. Thus, I write with two requests:

(1) Please send or provide a web link to any materials related to the pavement sealer issues of concern to the City of Des Plaines, and
(2) As I explained last week on the phone, I have a previous commitment that will not allow me to be present for the Des Plaines City Council meeting on March 21. Based both on this unbreakable commitment and the fact that it is unclear to the potentially impacted business community what the City's concerns are and what is being proposed to address those concerns, please ask the City Council to defer discussion of whatever the issue may be until the business community is given a chance to understand and respond to the City's concerns.

You can learn more about PCTC at the organization's web site: http://www.pavementcouncil.org/. For your information, PCTC members have manufacturing facilities located in Cook County, Illinois and surrounding areas. PCTC is in the process of gathering information about members' business activities in and around Des Plaines.

Thank you for your consideration,
Anne

Anne P. LeHuray, Ph.D.
Pavement Coatings Technology Council

Attachment 4

**CITY OF DES PLAINES**

**ORDINANCE M - 6 - 11**

**AN ORDINANCE AMENDING TITLE 5, "PUBLIC HEALTH AND SAFETY," OF THE DES PLAINES CITY CODE BY ADDING CHAPTER 7, "PROHIBITING THE USE AND SALE OF COAL TAR-BASED SEALANTS."**

**BE IT ORDAINED** by the City Council of the City of Des Plaines, Cook County, Illinois in the exercise of its home rule powers, as follows:

**SECTION 1:** That Title 5, "Public Health and Safety," of the Des Plaines City Code be amended by adding Chapter 7, "Prohibiting the Use and Sale of Coal Tar-Based Sealants" and read as follows:

**CHAPTER 7**
**PROHIBITING THE USE AND SALE OF COAL TAR-BASED SEALANTS**

**5-7-1: PURPOSE:**

The City of Des Plaines highly values lakes, rivers, streams and other bodies of water as natural assets which enhance the environmental, recreational, cultural and economic resources and contribute to the general health and welfare of the community.

The use of sealers on asphalt surfaces is a common maintenance practice. However, scientific studies on the use of pavement sealers have demonstrated a relationship between stormwater runoff and certain health and environmental conditions, including the presence of Polycyclic Aromatic Hydrocarbons, a possible carcinogen.

The purpose of this ordinance is to regulate the use of sealer products within the City of Des Plaines, in order to protect, restore, and preserve the quality of its waters. Further, it is the purpose of this ordinance to enhance compliance with the application prohibition through regulating sale of certain products.

**5-7-2: DEFINITIONS:**

Except as may otherwise be provided or clearly implied by context, all terms shall be given their commonly accepted definitions. For the purpose of this ordinance, the following definitions shall apply unless the context clear indicates or requires a different meaning:

**ASPHALT-BASED SEALER**: A petroleum-based sealer material that is commonly used on driveways, parking lots, and other surfaces and which does not contain coal tar.

**COAL TAR**: A byproduct of the process used to refine coal.

**COAL TAR-BASED SEALER**: A sealer material containing coal tar and is for use on an asphalt or concrete surface, including a driveway or parking area.

**CITY**: The City of Des Plaines.

**PAHs**: Polycyclic Aromatic Hydrocarbons. A group of organic chemicals formed during the incomplete burning of coal, oil, gas, or other organic substances. PAHs are present in coal tar are harmful to humans, fish, and other aquatic life.

**5-7-3: USE OF COAL TAR-BASED SEALER PROHIBITED:**

A. No person shall apply any coal tar-based sealer to any driveway, parking lot, or other surface within the City of Des Plaines.
B. No person shall contract with any commercial sealer product applicator, residential or commercial developer, or any other person for the application of any coal tar-based sealer to any driveway, parking lot, or other surface within the City.
C. No commercial sealer product applicator, residential or commercial developer, or other similar individual or organization shall direct any employee, independent contractor, volunteer, or other person to apply any coal tar-based sealer to any driveway, parking lot, or other surface within the City. A person who owns property on which a coal tar-based sealer has been applied presumed to have used a coal tar-based sealer in violation of this section.

**5-7-4: SALE OF COAL TAR-BASED SEALER RESTRICTED:**

A. A person may not sell a coal tar-based sealer product within the City, unless:

    1) The sale is to a person who intends to use the coal tar-based sealer outside the City's jurisdiction; and
    2) The seller requires the purchaser to complete and sign a form provided by the City that includes:

        a) The name, address, and phone number of the purchase;
        b) The date of the purchase;
        c) The quantity of coal tar-based sealer purchased;
        d) A statement that the coal tar-based sealer will not be used within the City of Des Plaines;
        e) An affirmation by the purchaser that the information on the form is correct; and
        f) The seller retains the completed form for a period of not less than two years and allows the City to inspect or copy of the form upon request.

**5-7-5: ASPHALT-BASED SEALCOAT PRODUCTS:**

The provisions of this ordinance shall only apply to the sale or use of coal tar-based sealer in the City and shall not affect the use or sale of asphalt-based sealer products within the City.

**5-7-6: PENALTY:**

Any person convicted of violating any provision of this ordinance is guilty of a misdemeanor and shall be punished by a fine not to exceed seven hundred fifty dollars ($750.00).

**SECTION 2:** If any paragraph, section, clause or provision of this Ordinance is held invalid, the remainder shall continue in full force and effect without affecting the validity of the remaining portions of the Ordinance.

**SECTION 3:** That this Ordinance shall be in full force and effect from and after its passage, approval and publication in pamphlet form according to law.

**PASSED** this _____ day of _____, 2011.

**APPROVED** this _____ day of _____, 2011.

**VOTE:** AYES _____ NAYS _____ ABSENT _____

_____
**MAYOR**

ATTEST:

_____
**CITY CLERK**

Published in pamphlet form this
____ day of _____, 2011.

_____
**CITY CLERK**

Approved as to form:

David R. Wiltse
**David R. Wiltse, City Attorney**

*Note: New language is underlined.*

Legal\Ord\2011\Add 5-7 Prohibiting the Use and Sale of Coal Tar-Based Sealants

Attachment #3

# Coal tar industry fights bans on sealants

## Lobbying group funds research, argues products are safe despite government studies linking them to pollution

March 28, 2013|By Michael Hawthorne, Chicago Tribune reporter

A plant in west suburban Stickney processes coal tar pitch. Koppers Inc., the Pittsburgh-based company that owns the plant, helped sponsor a February presentation that offered advice to contractors on how to defend the use of coal tar sealants. Mike Juba, a Koppers official, urged contractors to stress the industry-funded science in conversations with customers. (Zbigniew Bzdak, Chicago Tribune)

When officials in suburban Des Plaines read about the hazards of spreading cancer-causing coal tar on playgrounds, parking lots and driveways, they moved to join other communities across the nation that have banned pavement sealants made with the industrial byproduct.

A City Council committee ordered staff to research the issue, drafted an ordinance to outlaw the widely used products and recommended its passage. Aldermen cited federal, state and academic studies showing that coal tar sealants contain high levels of toxic chemicals, steadily wear off and crumble into dust tracked into houses and washed into waterways.

But the coal tar industry was ready for a fight. After Austin, Texas, in 2005 became the first U.S. city to ban coal tar sealants, industry leaders formed a tax-exempt lobbying group and started funding their own research — all in an effort to convince homeowners and elected officials that coal tar sealants are safe.

Industry representatives have cited their studies in presentations arguing that bans on coal tar sealants would do little to eliminate toxic chemicals in the environment. Promotional materials from contractors and manufacturers say the papers show that government studies are flawed, or "lies" as one brochure describes them.

"My members don't want to sell a product that causes harm," Anne LeHuray, executive director of the Pavement Coatings Technology Council, the industry lobbying group, said in an interview.

The industry's efforts have worked in some cases. Since 2010, cities including Des Plaines and Springfield, Mo., and the states of Illinois, Michigan and Maryland have rejected coal tar-related legislation after LeHuray and local contractors intervened.

"It seemed too confusing," said Patricia Haugeberg, a Des Plaines alderman who moved to table the Cook County suburb's proposed 2011 ban.

In a February presentation to contractors, a top industry representative boasted that they are beating government scientists "on their own turf."

Yet a Tribune review of the two industry-funded studies published in a peer-reviewed scientific journal in recent years found they fall short of proving their authors' contention that coal tar sealants pose few, if any, threats to human health and wildlife. And, the Tribune found, the industry has at times overstated the findings supporting coal tar.

Manufacturers promote coal tar pavement sealants as a way to extend the life of asphalt and brighten it every few years with a fresh black sheen. The products are most commonly used in states east of the Continental Divide; in the West, contractors tend to use asphalt-based sealants that contain significantly lower levels of worrisome chemicals.

Coal tar sealants contain up to 35 percent coal tar pitch, partially refined waste from steelmaking that the National Toxicology Program and the International Agency for Research on Cancer consider a known carcinogen. Among the chemicals of concern in the products are polycyclic aromatic hydrocarbons, or PAHs, which not only pose a cancer risk but can trigger developmental problems and impair fertility, according to the U.S. Environmental Protection Agency.

Peer-reviewed studies by government scientists have found that coal tar sealants are a major source, and sometimes the dominant source, of PAH contamination in urban areas. Other sources of the chemicals include vehicle exhaust and factory emissions.

In response to the growing body of federal research and regulatory pressures, the coal tar industry turned to a pair of consulting firms frequently hired by corporations dealing with environmental, health or safety issues — Exponent Inc. and Environ International. The industry-funded papers, published in a minor journal called Environmental Forensics, contend that coal tar sealants are at best a minor source of pollution.

The Exponent study, for instance, concludes that vehicle exhaust and industrial pollution are far bigger sources of PAHs than coal tar. But the finding is largely based on an older scientific model that does not include coal tar sealants as a potential source, leading the researchers to conclude that PAHs in the environment "can be explained in the absence of any contribution" from pavement sealants.

Kirk O'Reilly, an Exponent senior scientist and the study's chief author, said government researchers have overstated their conclusions and failed to consider "the large body of literature" about the chemicals. The government research, O'Reilly said in email response to questions, "does not prove that sealers are a source."

But at the end of his paper, O'Reilly acknowledges that coal tar sealants "cannot be eliminated as a PAH source."

The Environ International study, meanwhile, tested whether PAHs declined in Austin after the city's 2005 coal tar ban took effect. In a 2010 paper, the researchers reported they found that little had changed 21/2 years later, and industry representatives continue to cite the study as evidence that banning their products would not reduce PAHs in homes and waterways.

But coal tar pavement sealants weren't used in some areas where sediment samples were collected, including roadways and parking lots built after the Austin ban took effect, according to the text of the study. Austin also didn't require existing coal tar to be stripped from pavement, meaning many potential sources of pollution remained after the ban.

The researchers state that it could take more than two years to determine whether the Austin coal tar ban worked. One of the most dangerous PAHs, benzo(a)pyrene, is federally listed as a persistent chemical like DDT and PCBs, which were banned during the 1970s but took years to decline in the environment.

Robert DeMott, an Environ toxicologist and the study's chief author, has told contractors and elected officials that Austin's move to eliminate coal tar sealants failed to make a difference, largely because there are so many other sources of PAHs. But in an interview he acknowledged that his study didn't reach such a definitive conclusion.

"The question boils down to how much of a change is a meaningful change," DeMott said. "If you remove one part out of thousands of contributors, will you ever be able to see a difference? That is a question that remains unanswered."

Asked if industry funding affected their conclusions, the Exponent and Environ researchers said their opinions are their own.

Barbara Mahler, one of the government scientists who first identified coal tar sealants as a major source of PAH contamination, said industry representatives haven't accurately represented her research findings in their presentations.

"They make very misleading statements, and if you don't know any better it can all sound convincing," Mahler said in an interview. "The conclusions of their studies are they can't reach any conclusions. But you wouldn't know that from what they say to the public."

During the past decade, Mahler and Peter Van Metre of the U.S. Geological Survey roiled the coal tar industry with a series of peer-reviewed studies that found high levels of PAH contamination in areas where coal tar sealants are used. Dramatically lower levels were found in Western cities.

In Lake in the Hills, about 50 miles northwest of Chicago, they found levels of benzo(a)pyrene in dust from coal tar-covered driveways that were up to 5,300 times higher than the level that triggers an EPA Superfund cleanup at polluted industrial sites.

The USGS scientists also found that parking lots with 3- to 8-year-old sealant released 60 times more PAHs into the air than parking lots without sealant. Other researchers from the EPA and the University of New Hampshire have found significantly higher PAH levels in runoff from parking lots sealed with coal tar than in runoff from asphalt-sealed lots.

"This is a common-sense issue," said Judy Crane, a scientist for the Minnesota Pollution Control Agency who determined that coal tar sealants are the leading source of PAH contamination in Minneapolis-St. Paul stormwater ponds. "You can see the stuff flaking off and being tracked inside or washed into waterways."

New research from Baylor University adds to that troubling picture. The study, published two months ago in the peer-reviewed scientific journal Environmental Science and Technology, found that exposure to coal tar-contaminated dust during the first six years of life significantly increases the risk of developing cancer.

"It's very difficult to attribute environmental cancers to any one source, and PAHs are everywhere," said Spencer Williams, a Baylor research toxicologist and the study's chief author. "But these coal tar sealers are a big dollop of PAHs that you wouldn't get anywhere else."

A month after the study came out, the industry lobbying group hosted an hourlong Web presentation that promised to teach contractors "how you can be successful in defense and what to say to customers, media, and even state and local officials who have questions about the lifeblood of your business." One of the sponsors was Koppers Inc., a Pittsburgh-based company that processes coal tar at a plant in west suburban Stickney.

Mike Juba, a Koppers health and safety official, urged contractors to stress the industry-funded science in conversations with customers. He also advised them to talk about their contributions to local economies.

"To eliminate a useful product and put the businesses and jobs of real people at risk ... hurts more people than it helps," Juba said during the presentation. Koppers and Juba did not return calls seeking comment.

There are signs that the industry's initial successes in places like Des Plaines might be fading. Coal tar sealants have been banned in suburban South Barrington, the state of Washington, counties in Maryland, New York and Wisconsin, and more than two dozen Minnesota cites. More than 40 contractors in the Minneapolis-St. Paul area and 25 others in Wisconsin have signed pledges to not sell the products.

"Once people are educated about this, they realize it just makes sense to stop adding hazardous materials to the environment when there are other options that don't pose the same hazards," said Al Innes, a Minnesota state official who oversees an EPA-funded program that seeks to reduce the use of coal tar sealants.

Officials in Springfield, Mo., rejected a coal tar ban in 2010 after industry officials and the scientists they funded gave presentations saying the proposal was misguided. One of the opposition's key arguments was that there was no proof that PAH contamination was a problem in local streams.

But in November, a researcher from Missouri State University reported to local officials that he had found high levels of PAHs in nearly half of the two dozen samples he collected from

Springfield-area waterways. The highest concentrations were found near parking lots covered in coal tar sealants.

"The industry pulled out all the stops because they didn't want us to set a precedent for other cities," said Cindy Rushefsky, a Springfield councilwoman. "We've got our own data and the data is strong. Austin is not unique and neither are we. They should see the writing on the wall."

She plans to reintroduce the proposal later this year.

*mhawthorne@tribune.com*

*Twitter @scribeguy*

Attachment #4



# Actions to restrict or discontinue the use of Coal Tar-Based Sealants in the United States

Current as of January 1, 2014

## Governments

| Action | State/District | Jurisdiction* and 2010 Population** | |
|---|---|---|---|
| Ban or Ordinance | District of Columbia | Washington | 601,723 |
| | Illinois | South Barrington | 4,565 |
| | Kansas | Winfield | 12,301 |
| | Maryland | Montgomery County | 971,777 |
| | Minnesota | Statewide | 5,303,925 |
| | New York | Suffolk County | 1,493,350 |
| | South Carolina | Greenville | 59,306 |
| | Texas | Austin | 790,390 |
| | | Bee Cave | 3,925 |
| | | Edwards Aquifer, Comal and Hays Counties | 265,579 |
| | Washington | Statewide | 6,724,540 |
| | Wisconsin | Dane County | 488,073 |
| Restricted use jurisdictions | Massachusetts | Andover Wetlands | |
| | | Commonwealth Wetlands | |
| | | Sudbury | |
| | North Carolina | Boone | |
| Government use restrictions† | California | California Department of Transportation | |
| | Illinois | City of Lake in the Hills | |
| | | City of Spring Grove | |
| | | DuPage County/Salt Creek Watershed | |
| | | McHenry County | |
| | Minnesota | All State Agencies | |
| | Missouri | City of Springfield | |

## Companies

| Action | Area | Company* |
|---|---|---|
| Home Improvement Stores Which Have Stopped Selling Coal Tar-Based Sealants | Nationwide Distribution | Ace Hardware, Do It Best††, Lowe's††, The Home Depot, True Value |
| | Regional Distribution | Agway, Menards, United Hardware (Hardware Hank and Trustworthy) |
| Applicators Committed to Phase-Out | In WI, MI, ND, IA, IL, and MN (pledged prior to 1/1/14 state ban) | See interactive map and listing at http://www.pca.state.mn.us/uu4yx6y |

## Universities and schools

| Action | Institution |
|---|---|
| Formal institutional governance ending use | University of Michigan |
| | San Diego Unified School District |

Note: A large number of school districts around the country have informal policies not to use coal tar-based sealcoats. However, these actions are not currently feasible to track.

*sources: combination of Google searches, accessing Coal Tar Free America Blog (http://coaltarfreeamerica.blogspot.com/p/bans.html), personal interviews, evaluating Material Safety Data Sheets for sealant products, in-store visits conducted by Judy L. Crane, Ph.D., and contacts to and outreach by Minnesota Pollution Control Agency (MPCA) staff under the Great Lakes Coal Tar Sealcoat/PAH Reduction Project, funded by U.S. Environmental Protection Agency's (EPA) Great Lakes Restoration Initiative.

**source: 2010 Census Interactive Population Search webpage (http://www.census.gov/2010census/popmap/ipmtext.php).

†most state Departments of Transportation no longer use coal tar-based sealants (AASHTO 2011; http://environment.transportation.org/pdf/communities_of_practice/stormwatercopjan2011.pdf)

††contact with Do It Best and Lowe's is ongoing since coal tar-based sealants have recently been found in some of their stores (EPA communications, 1/4/13 and 1/22/13)

**DISCLAIMER**: This table was originally prepared by Judy Crane, Ph.D. to support a feature article in *Environmental Science and Technology* on "Coal-tar-based pavement sealcoat and PAHs: Implications for the environment, human health, and stormwater management" (Mahler et al. 2012). MPCA will attempt to update this document in as timely a fashion as is possible within resource constraints. Due to the difficulty involved with tracking restricted use jurisdictions and government use restrictions of coal tar-based sealants, however, this information may not be fully complete. If readers have questions or would like to pass along information on new coal tar sealcoat restrictions, call 651-296-6300 or 800-657-3864 and ask for Pollution Prevention/Green Chemistry staff.

# Coal Tar-based Sealcoat

## Environmental concerns

wq-strm4-12 • September 2009

If you decide to sealcoat your asphalt driveway this year, there are a few things you should know. Sealcoating makes old asphalt look new and protects its surface, but there are serious environmental concerns with its use.

Sealcoat comes in two basic varieties: coal tar-based and asphalt-based. The coal tar variety is more resilient, but it contains much higher levels of a class of chemicals called PAHs (polycyclic aromatic hydrocarbons) that harm fish, and with prolonged exposure, pose a risk of cancer in humans (see Figure 1).

### Environmental problems

Coal tar is a waste material generated in the conversion of coal to coke. Manufacturers choose coal tar for sealcoat because of its resistance to petroleum products like gasoline and oil, which drip from cars and deteriorate asphalt surfaces. In time, sunlight and vehicle traffic wears down sealcoat and sealcoat flakes are washed away by rain or carried away by wind, contaminating stormwater ponds, streams and lakes with PAHs.

PAHs cause tumors in some fish, disrupts the reproduction of aquatic organisms, and causes some water-bottom species to avoid sediment altogether. Health risks to humans related to PAHs are based on the length of exposure to vapors or sediments contaminated with PAHs.

### PAH Concentrations

Coal tar contains as much as 30 percent PAHs by weight. A study in Austin, Texas, compared the level of PAHs in water coming off parking lots without sealcoat to water coming off parking lots coated with asphalt- and coal-tar sealcoat (Figure 2).

**Figure 1: Relative amounts of PAHs in sealcoat products**

**An Austin, Texas, study determined that sealcoat products based on coal tar contained up to 1,000 times more PAHs than asphalt-based products. Consider asphalt-based sealcoat if you choose to coat your driveway.**

**Figure 2: Concentrations of PAHs in runoff**

**Asphalt-based sealcoat runoff (B) can contain 10 times more PAHs than an uncoated driveway (A) and runoff from a coal-tar sealcoated driveway (C) may have concentrations of PAH 65 times higher than an uncoated driveway.**

The study revealed that the asphalt-based sealcoat runoff contained 10 times more PAH than the uncoated parking lot and the coal-tar sealcoat runoff had concentrations of PAH that were 65 times higher than the uncoated lot.

## Maintenance expenses

Besides the health effects and the danger to the environment, PAHs are making routine maintenance of stormwater ponds by cities and townships many, many times more expensive because sediment with high-enough concentrations of PAHs must be disposed of differently.

In Minnesota, when some cities removed sediment from their stormwater ponds as part of regular maintenance, they found elevated levels of PAHs. This discovery required them to find special disposal areas, costing them many thousands of dollars more.

## Current regulation

Because of the environmental problems associated with PAHs, the City of Austin, Texas, Dane County, Wisconsin, and Washington D.C. have banned use of coal tar-based sealcoat in their jurisdictions (asphalt-based sealcoat may still be used).

Recent legislation passed in Minnesota bans the purchase of coal-tar sealcoat products by state agencies by July 1, 2010. Recently, two national home-improvement retailers, Lowe's and Home Depot, took coal tar-based sealcoat off their shelves. Check with your local unit of government to see if there are any restrictions.

## Make the right choice

The best choice may be to not sealcoat your driveway at all. But if you do choose to sealcoat, study labels carefully to be sure to find an asphalt-based product. Lower concentrations of PAHs in waterways will prevent costly maintenance for your city and keep waterways safe for fish and other aquatic organisms.

If you have leftover material after sealing your driveway, you can re-use or recycle it at your community's household hazardous waste facility. To find your local facility,
visit: www.pca.state.mn.us/waste/hhw

## References

Van Metre, P.C., Mahler, B.J., Scoggins, M., and Hamilton, P.A., 2006. Parking Lot Sealcoat: A Major Source of Polycyclic Aromatic Hydrocarbons (PAHs) in Urban and Suburban Environments. A USGS report prepared in cooperation with the City of Austin, Texas.

Attachment #5

# Office of the City Clerk

O2013-2557

Office of the City Clerk

City Council Document Tracking Sheet

| | |
|---|---|
| **Meeting Date:** | 4/10/2013 |
| **Sponsor(s):** | Burke, Edward M. (14)<br>Burns, William D. (4) |
| **Type:** | Ordinance |
| **Title:** | Amendment of Chapter 7-28 of Municipal Code by adding new Section 634 to prohibit sale and use of coal tar sealants |
| **Committee(s) Assignment:** | Committee on Finance |

Xinan

**ORDINANCE**

**WHEREAS,** the City of Chicago is a home rule unit government pursuant to the 1970 Illinois Constitution, Article VII, Section 6(a); and

**WHEREAS,** pursuant to its home rule power, the City of Chicago may exercise any power and perform any function relating to its government and affairs, including the power to regulate for the protection of the public health, safety, morals, and welfare; and

**WHEREAS,** coal tar sealants are used on asphalt driveways and parking lots to protect surfaces from weathering; and

**WHEREAS,** coal tar contains high levels of benzo(a)pyrene and other toxic chemicals known collectively as polycyclic aromatic hydrocarbons, or PAHs, which have been linked to cancer and other health problems; and

**WHEREAS,** in Lake of the Hills, approximately 50 miles northwest of Chicago, researchers from the U.S. Geological Survey found levels of benzo(a)pyrene, one of the most toxic chemicals in coal tar, in the dust from coal tar-covered driveways that were up to 5,300 times higher than the level that triggers a U.S. Environmental Protection Agency Superfund cleanup at polluted industrial sites; and

**WHEREAS,** other researchers have found significantly higher PAH levels in runoff from parking lots sealed with coal tar than in runoff from asphalt-sealed lots; and

**WHEREAS,** coal tar sealants have been banned in the state of Washington, counties in Maryland, New York and Wisconsin, the cities of Austin, Texas, South Barrington, Illinois, and over two dozen Minnesota cities; and

**WHEREAS,** the City Council of the City of Chicago hereby finds that it is in the best interest of the public health, safety and welfare to prohibit the sale and use of sealants containing coal tar; NOW THEREFORE

**BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CHICAGO:**

**SECTION 1.** The above recitals are expressly incorporated herein and made part hereof as though fully set forth herein.

**SECTION 2.** Chapter 7-28 of the Municipal Code of Chicago is hereby amended by inserting a new section 7-28-634 as follows:

**7-28-634 Coal tar sealants – Prohibition on sale and use.**

(a) As used in this section, the term "coal tar sealer" shall mean a sealer material containing coal tar for use on an asphalt or concrete surface, including a playground, driveway, or parking area.

(b) It shall be unlawful for any person to sell, offer or expose for sale, give or furnish any coal tar sealer within the City of Chicago.

(c) It shall be unlawful for any person to apply any coal tar sealer to any playground, driveway, parking lot, or other surface within the City of Chicago.

(d) It shall be unlawful for any person to contract for the application of any coal tar sealer to any playground, driveway, parking lot or other surface within the City of Chicago.

(e) It shall be unlawful for any person to direct any employee, independent contractor, volunteer, or other person to apply any coal tar sealer to any playground, driveway, parking lot, or other surface within the City of Chicago.

(f) Any person violating this section shall be fined not less than $100.00 nor more than $300.00 for the first offense, and not less than $300.00 nor more than $500.00 for the second and each subsequent offense. Each day that a violation continues shall constitute a separate and distinct offense.

**SECTION 3.** This ordinance shall be in full force and effect 30 days after its passage and publication.

Edward M. Burke, Alderman, 14th Ward

William Burns, Alderman, 4th Ward

Attachment #6

# "Model" Ordinance on Coal Tar Sealants

**Overview**

Parking lots and driveways dominate the urban landscape across McHenry County, and sealcoating these surfaces is widely recommended. Among the most widely used sealcoats, are those containing refined coal tar[1]. Coal tar sealants contain high levels of polycyclic aromatic hydrocarbons (PAHs), which are toxic to fish and other aquatic life. In addition, PAH's are a known carcinogen[2].

Recent studies[3] show that coal tar sealcoat products used as a means to protect asphalt pavement is a significant source of PAH contamination in our lakes and streams. Studies[4] in Austin, TX and Puget Sound near Olympia, WA demonstrate that the PAH compounds run off into lakes and streams and are toxic to fish. Additional information shows that PAHs can be detected in blood or urine soon after exposure[5].

The model ordinance prohibits the use, sale or retail display of sealcoat products within McHenry County (applies to all unincorporated McHenry County and all municipalities that have adopted this ordinance) that are labeled as containing coal tar. It also requires retailers to prominently display information about the ordinance where customers make their driveway sealant purchases. There is an ordinance exemption for those who intend to apply sealcoat products on a surface that is not located within McHenry County. Sellers must require purchasers seeking the exemption to complete an exemption form[6].

The proposed ordinance regulating the use and sale of coal tar sealants within McHenry County is attached. The associated fact sheet and exemption form are also attached and available at www.mchenryh2o.com.

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[1] Van Metre, P.C.; Mahler, B.J.; Wilson, J.T.; Burbank, T.L. *Collection and Analysis of Samples for Polycyclic Aromatic Hydrocarbons in Dust and Other Solids Related to Sealed and Unsealed Pavement from 10 Cities Across the United States, 2005-07*; USGS Data Series 361; U.S. Geological Survey: Denver, CO, 2008; 5 pp; http://pubs.usgs.gov/ds/361/. (accessed November 2008)

[2] U.S. Department of Health and Human Services. *Report On Carcinogens*, 10th ed.; National Toxicology Program, Public Health Service : Washington, DC, December 2002.

[3] Van Metre, P.C.; Mahler, B.J.; Wilson, J.T.; 2008, *PAHs Underfoot: Contaminated Dust from Coal-Tar Sealcoated Pavement is Widespread in the United States*. Downloaded from http://pubs.acs.org on November 19, 2008.

[4] Lake In The Hills, Illinois was a study site for footnotes 1 and 3. "Concentrations of PAHs in soil and street dust near sealcoated pavement in Lake in the Hills exceeded those near unsealcoated pavement by a factor ofr from 6.4 to 39 (street dust) and 2.3 to 14 (soil)." (see Table 2 from footnote 3). In addition, 29/30 driveways samples had coal tar and 15-20% of sub-watershed was impacted by coal tar.

[5] Wisconsin Department of Health Services. Chemical Fact Sheet: *Polycyclic Aromatic Hydrocarbons*. http://dhs.wisconsin.gov/eh/chemfs/fs/PAH.htm

[6] Exemption form is available at www.mchenryh2o.com

# Polycyclic Aromatic Hydrocarbon (PAHs)
# Quick Facts

## Polycyclic Aromatic Hydrocarbon Compounds Are Harmful to Aquatic and Human Life

- Several PAHs are suspected human carcinogens.
- PAHs are very persistent in the environment.
- Austin, Texas biological studies revealed a loss of species and decreased number of organisms.
- Puget Sound Ambient Monitoring Program found the following related to the presence of PAHs:
    - Liver lesions and tumors in fish.
    - Liver problems led to reproductive impairment
    - Malformations in fish embryos and embryonic cardiac dysfunction.
    - Reduction in aquatic plants (Eelgrass) that provide fish habitat.

## Coal Tar Sealcoat a Significant Source of PAHs

- Coal Tar Sealcoat products contain as much as 30% coal tar by weight.
- Coal tar contains 50% or more PAHs by weight.
- Friction of automobile tires causes sealcoat to flake off. Precipitation running off surfaces carries the particles into storm sewers that empty into lakes and streams.
- City of Austin, TX and USGS collaborated on study: Parking lots with coal-tar sealcoat yielded 65 times more PAH than on unsealed lots in simulated rain events.

## Coal Tar and PAHs are Prevalent in McHenry County

- It takes about 450 gallons of sealcoat to apply a single coat to one acre of parking lot. Typically two coats are applied.
- Applicators suggest reapplication of sealcoat every two to three years.
- The city of Madison, Wisconsin estimates that about 300,000 gallons of sealcoat are applied every year in the Madison area. Austin, Texas estimates 600,000 gallons are used.

## Actions Taken:

- Lowes and Home Depot Home Improvement stores have discontinued the sale of Coal Tar Sealants nationwide.
- The City of Austin, TX passed an ordinance in 2005 prohibiting the use and sale of CTS
- Dane County, WI passed similar ordinance in 2007

## Alternative Products Available

- Asphalt sealcoat
- Latex modified asphalt sealer (Master Guard®)

## Resources on the Web

- http://pubs.usgs.gov/fs/2005/3147
- www.ci.austin.tx.us/watershed/coaltar_main.htm
- http://198.238.33.67/fish/psamp/study.htm
- http://www.esw.org/news/archives/2005/08/cars_replacing_industry_as_lea.php
- http://www.nwfsc.noaa.gov/research/divisions/ec/ecotox/fishneurobiology/cardio.cfm
- http://water.usgs.gov/nawqa/asphalt_sealers.html

**ORDINANCE NO. XXX**

**AMENDING CHAPTER XXX OF THE (County or Municipality) CODE OF ORDINANCES REGULATING THE APPLICATION AND SALE OF COAL TARE SEALCOAT PRODUCTS**

WHEREAS, the (County or Municipality), finds that McHenry County's water resources are a natural asset, which enhance the environmental, recreational, cultural and economic resources of the area and contribute to the general health and welfare of the public.

WHEREAS, finds that polycyclic aromatic hydrocarbons (PAHs), which are contained in coal tar sealants, can be carried by stormwater and other run off into the water resources of McHenry County.

WHEREAS, PAHs are an environmental concern because they are toxic to aquatic life, resulting in a loss of species and a decreased number of organisms.

WHEREAS, environmental impacts can be minimized and pavements can be maintained by utilizing alternative products, absent PAHs.

WHEREAS, the (County or Municipality) finds that regulating the amount of contaminants, including Polycyclic Aromatic Hydrocarbons (PAHs) contained in coal tar sealcoat products, entering the water resources of the (County or Municipality) will improve and protect the water quality of (County or Municipality) and neighboring water resources.

NOW, THEREFORE, BE IT ORDAINED by the (insert title of elected representative) and Board of Trustees of the (County or Municipality), McHenry County, Illinois, as follows:

**SECTION 1:** Title (insert number) of the (County or Municipality) Code is amended to add a new Chapter (insert number) to read:

**CHAPTER XXX. COAL TAR PAVEMENT PRODUCTS**

**XXX-1: DEFINITIONS**

(1) COAL TAR is a byproduct of the process used to refine coal. Coal tar contains high levels of polycyclic aromatic hydrocarbons (PAHs).

(2) COAL TAR PAVEMENT PRODUCT means a material that contains coal tar and is for use on an asphalt or concrete surface, including a driveway or parking area.

(3) POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) are a group of organic chemicals that are present in coal tar and are an environmental concern because they are toxic to aquatic life.

(4) SEALCOAT is a black liquid that is sprayed or painted on asphalt pavement in an effort to protect and beautify the asphalt. Most sealcoat products are coal-tar or asphalt based.

(5) DIRECTOR means the director of the (insert department name).

**XXX-2 ENFORCEMENT.**

Violations of this ordinance will be enforced by the (County or Municipality).

**XXX-3 REGULATION OF THE APPLICATION AND SALE OF SEALCOAT PRODUCTS CONTAINING COAL TAR.**

(A) Except as provided in Section XXX-4 *(Exemptions),* No person shall apply any sealcoat product within (County or Municipality) that is labeled as containing coal tar.

(B) No person shall sell, offer to sell, or display for sale any sealcoat product within (County or Municipality) that is labeled as containing coal tar.

(C) Any person who sells pavement sealcoat products shall prominently display, in the area where such pavement sealcoat products are sold, a notice that contains the following language: "The application of coal tar sealcoat products on driveways, parking lots and all other paved surfaces in (County or Municipality) is prohibited by Chapter XXX of the (enter name) Code of Ordinances. Coal tar is a significant source of Polycyclic Aromatic Hydrocarbons (PAHs), a group of organic chemicals that can be carried by stormwater and other run off into the water resources of McHenry County. PAHs are an environmental concern because they are toxic to aquatic life."

(D) A person who owns property on which a coal tar pavement product is used is presumed to have used a coal tar pavement product in violation of this section.

(E) Any person, who applies, sells, offers to sell or displays for sale any sealcoat product within (County or Municipality) that is labeled as containing coal tar is presumed to have applied, sold, offered to sell or displayed the product in violation of this section.

**XXX-4: EXEMPTIONS.**

The director may exempt a person from a requirement of this chapter if the director determines that:

(1) The sale of a sealcoat product containing coal tar to a person who intends to apply the product on a surface that is not located within (County or Municipality) is permitted under the following conditions:

a. The seller requires the purchaser to complete and sign a form, to be provided by the Water Resource Division of the County of McHenry, that includes the purchaser's name, address, phone number, date of purchase, quantity purchased and a statement that the coal tar sealcoat product will not be applied on a surface that is located within (County or Municipality).

b. The seller retains the completed form for a period of not less than three (3) years from the date of sale and allows the inspection and copying of the form by (County or Municipality) staff upon request.

(2) The Director of (insert title of appropriate department) may exempt a person from the requirements of section XXX-3 if the person is conducting *bona fide* research concerning the effects of a coal tar sealant product on the environment and the use of the coal tar product is required for said research.

**XXX-5: PENALTY.**

(A) Any person who violates XXX-3 by applying a coal tar sealant product at his or her residence shall be subjected to a fine not to exceed $500.

(B) Each day that a violation occurs or continues is a separate offense and subject to an additional fine.

(C) Any commercial sealcoat product applicator, residential or commercial developer, industrial or commercial owner, or any other person, other than a person identified under sub. (A) above who violates XXX-3, shall be subject to a fine of $100 for the first violation within a twelve month period, $300 for the second violation within a twelve month period, and $500 for the third and each subsequent violation within a twelve month period.

**SECTION 2:** If any section, paragraph, subdivision, clause, sentence or provision of this Ordinance shall be adjudged by any Court of competent jurisdiction to be invalid, such judgment shall not affect, impair, invalidate or nullify the remainder thereof, which remainder shall remain and continue in full force and effect.

**SECTION 3:** All ordinances or parts of ordinances in conflict herewith are hereby repealed to the extent of such conflict.

**SECTION 4:** This ordinance shall be in full force and effect ten (10) days after its passage, approval, and publication in pamphlet form, as provided by law.

Ayes:

Nays:

Absent:

Abstain:

APPROVED:

_____

(SEAL)
ATTEST: _____

Passed: _____

Approved: _____

Published: _____

Attachment #7

# Chapter 17
# COAL TAR PAVEMENT PRODUCTS

## 4-17-1: DEFINITIONS:

COAL TAR: A byproduct of the process used to refine coal. Coal tar contains high levels of polycyclic aromatic hydrocarbons (PAHs).

COAL TAR PAVEMENT PRODUCT: A material that contains coal tar and is for use on an asphalt or concrete surface, including a driveway or parking area.

POLYCYCLIC AROMATIC HYDROCARBONS (PAHs): A group of organic chemicals that are present in coal tar and are an environmental concern because they are toxic to aquatic life.

SEAL COAT: A black liquid that is sprayed or painted on asphalt pavement in an effort to protect and beautify the asphalt. Most seal coat products are coal tar or asphalt based. (Ord. 2012-961, 4-12-2012)

## 4-17-2: ENFORCEMENT:

Violations of this chapter will be enforced by the village of South Barrington. (Ord. 2012-961, 4-12-2012)

## 4-17-3: REGULATION OF THE APPLICATION OF SEAL COAT PRODUCTS CONTAINING COAL TAR:

A. No person shall apply any coal tar containing seal coat product within the village of South Barrington.

B. A person who owns property on which a coal tar pavement product is used is presumed to have used a coal tar pavement product in violation of this section. (Ord. 2012-961, 4-12-2012)

## 4-17-4: VIOLATION AND PENALTY:

Any violation of any provision of this chapter shall constitute a municipal civil infraction subject to the remedies specified in title 1, chapter 4, "General Penalty", of this code. (Ord. 2012-961, 4-12-2012)

**MINUTES**
**WINNETKA VILLAGE COUNCIL STUDY SESSION**

**April 8, 2014**

(Approved: May 6, 2014)

A record of a legally convened meeting of the Council of the Village of Winnetka, which was held in the Village Hall Council Chambers on Tuesday, April 8, 2014 at 7:00 p.m.

1) Call to Order. President Greable called the meeting to order at 7:02 p.m. Present: Trustees Arthur Braun, Patrick Corrigan, Richard Kates and Stuart McCrary. Absent: Trustee Jack Buck. Also in attendance: Village Manager Robert Bahan, Assistant to the Village Manager Megan Pierce, Village Attorney Katherine Janega, Community Development Director Mike D'Onofrio, Assistant Community Development Director Brian Norkus, Public Works Director Steve Saunders, Business Community Development Commission Chair Jason Harris, and approximately 16 persons in the audience.

2) BCDC Recommendations – Retail Overlay District. Mr. Harris said the Business Community Development Commission (BCDC) has been studying the Retail Overlay District since November, 2013. He noted that the West Elm district is very healthy, with only one vacancy; versus East Elm and Hubbard Woods, which have many vacancies. He explained that the retail environment has changed dramatically in the last few years due to internet shopping trends. The BCDC took a proactive view based on the assumption that the best way to draw people to the commercial districts is a mixture of retail, services, and restaurants, rather than strictly retail uses. Mr. Harris reviewed the BCDC's recommendations as follows:

   Allow the following uses by right and limit their size to 3,000 square feet:

   - Personal service establishments
   - Educational therapy and counseling services
   - Architects, interior design services and home builders
   - Certain financial services (accountanting/bookkeeping, financial planning, income tax services, insurance sales, loan/mortgage brokers, and stock/commodity/security brokers)
   - Medical/dental offices

   Modify the Retail Overlay District boundaries by removing the following areas from the existing Overlay District:

   - 1043 – 1049 Tower Road
   - 1046 – 1062 Gage Street
   - 511 – 515 Lincoln Avenue
   - 554 – 572 Lincoln Avenue
   - 545 – 551 Lincoln Avenue
   - 809 – 821 and 810 Chestnut Court
   - 844 Spruce Street and 566 Chestnut Court

   Mr. Harris requested policy direction on the recommendations, and also recommended that the Council refer some or all of them to the Plan Commission to evaluate for consistency with *Winnetka 2020*, the Village's Comprehensive Plan.

Trustee Kates confirmed with Mr. Harris that there are no retail business owners on the BCDC, and he noted that ULI did not provide any examples of business districts that benefitted from removing an overlay district. Mr. Harris agreed that there is no data available about the efficacy of removing the Overlay.

Trustee Corrigan said he would not have a problem removing the Retail Overlay if the parking problems could be solved; and he added that he would like a recommendation on the Retail Overlay from the Plan Commission.

Mr. Harris said the BCDC only studied parking as it relates to new development, but that he thought the parking shortage needs to be addressed on several fronts, from short-term relief to building a new lot.

Mr. D'Onofrio said the parking problem is a combination of perception and reality, as people typically want to park immediately in front of their destination. Downtowns need to accommodate patrons, commuters and employees. The most recent parking study was conducted in 2006, and as the environment may have changed since that time, more study is needed.

Jim Sayegh, BCDC member and owner of 572-572 Lincoln Avenue. Mr. Sayegh commented that no information about a parking problem was included for the BCDC to study, and therefore it was not studied. He said the issue is not parking, but a lack of pedestrian daytime traffic in the business districts, and that including some of the recommended uses would cure that problem.

Gwen Trindl, 800 Oak Street. Ms. Trindl expressed concern about the BCDC's recommendations on shrinking the Overlay District, as the community has a vested interest in the sales tax generated from retail uses. She said the Village needs qualified economic development staff to focus on attracting retail businesses to the Village, and she suggested getting feedback from the residents.

Louise Holland, 545 Oak Street. Ms. Holland commented that the ULI panel was comprised of mainly real estate developers, not experts in attracting retail businesses to a community like Winnetka. The commercial districts need rehabilitation in the form of new lighting, pavements and greenery if pedestrians are going to be attracted. Less sales tax revenue means higher property taxes for residents. Finally, she said the BCDC's recommendations should first go before the Plan Commission and the Zoning Board before being discussed by the Council.

Penny Lanphier, 250 Birch. Ms. Lanphier said while the involvement of the BCDC is important, she also thought the Plan Commission and Zoning Board should be given a chance to study the Overlay Districts and make recommendations. She also suggested holding resident workshops to draw the community into the conversation about the business districts.

Trustee Kates thanked the BCDC for their hard work, and added that the Plan Commission should study the recommendations and also get feedback not only from residents but also the retailers, as they are an important part of the discussion.

Trustee Braun said high taxes for the commercial properties contribute to the vacancy rate, and he added that supporting retail space in Winnetka is made difficult by competition from internet shopping and large shopping malls.

Trustee Kates asked how commercial rents in Winnetka compare to other communities, as rents and landlords are the two major factors affecting retailers. Mr. D'Onofrio said he would estimate that they are higher than the surrounding area.

After further discussion, the Council agreed to send the BCDC's recommendations to the Plan Commission and Zoning Board of Appeals for further review. A deadline of four months was set for the recommendations to be completed.

President Greable asked Mr. Harris if there were any issues the BCDC would like to spend more time on. Mr. Harris said the Commission is interested in working with the Council and Village staff on communication and branding of the community; incentivizing retailers; and creating Village-wide events to make good use of the community's assets.

The Council directed the BCDC to work on these tasks and report back to the Council.

3) MWRDGC Watershed Management Ordinance and Intergovernmental Agreement.
Mr. Saunders explained that last fall, the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) passed a Watershed Management Ordinance (WMO), which becomes effective on May 1, 2014. As discussed at the November 14, 2013 Study Session, the Village Council agreed with recommendations from Baxter and Woodman (B&W) and Staff that Winnetka should proceed with becoming an authorized municipality under the WMO, in order to locally administer the WMO. The benefits of doing so include: (i) keeping the permit application process for most applicants local, thereby sparing them a double process with Cook County; and (ii) the Village already enforces a number of stormwater management requirements through its Design Engineering Guidelines, and becoming an authorized municipality provides an opportunity to combine the Village's regulations with WMO requirements.

Mr. Saunders reviewed the steps necessary to meet MWRDGC requirements: (i) pass a Code amendment adopting the WMO by reference; (ii) adopt a Resolution approving an intergovernmental agreement with the MWRDGC; and (iii) consider waiving introduction of the Code amendment ordinance so that it will be adopted before the effective date of the WMO.

Mark Phipps, B&W, reviewed the differences between the WMO and the Village's current stormwater regulations, and he recommended that the Village Code be updated to match the new County-wide standards. He noted that much of the WMO deals with large developments, whereas Winnetka is more concerned with single family parcels. In cases where the WMO standards exceed Village of Winnetka regulations, there is no need to apply those higher standards to the smaller parcels that the Village regulates, but B&W does recommend incorporating some Best Management Practices to improve water quality runoff.

Mr. Saunders explained that under current stormwater regulations, new single family homes in the floodplain have the option to follow a process to get the home removed from FEMA's floodplain map, thereby allowing a basement to be constructed. The WMO will make this process difficult, if not impossible, on smaller lots. A variance will have to be applied for, and the variation process is out of the Village's purview.

After a brief discussion, the Council directed Staff to proceed with becoming an authorized community by preparing a Code amendment ordinance for the April 17th Council meeting, where introduction will be waived, and by drafting a resolution for the intergovernmental agreement with the MWRDGC.

4) Coal Tar Policy. Manager Bahan said Staff has provided research on coal tar, and he explained that local big box hardware stores no longer sell coal tar-based sealants. The policy consideration for the Council is whether to license providers who do the seal coating or require permits for seal coating, which both could take a lot of staff time. Another option would be to educate the public on the deleterious effects of coal tar runoff.

   The Council discussed the issues associated with requiring a permit for seal coating driveways, and reached a consensus that more information is needed. They directed the matter to be sent to the Environmental and Forestry Commission, with a report to the Council in two months' time.

   Carol Fessler, 1314 Trapp Lane. Ms. Fessler said there are many components that need to be examined in the context of stormwater quality, including public education; and she questioned whether it is worth taking the time to focus narrowly on a single issue.

5) Public Comment. None.

6) Executive Session. None.

7) Adjournment. Trustee McCrary, seconded by Trustee Kates, moved to adjourn the meeting. By voice vote, the motion carried. The meeting adjourned at 9:30 p.m.

_____

Recording Secretary

**ATTACHMENT #2**

WINNETKA ENVIRONMENTAL AND FORESTRY COMMISSION

**REGULAR MEETING**
**April 9, 2014**

**(Approved May 7, 2014)**

A record of a legally convened meeting of the Environmental and Forestry Commission of the Village of Winnetka, which was held in the Village Council Room, 510 Green Bay Rd., Winnetka, Illinois, Wednesday, April 9, 2014, at 7:30 pm.

Call to Order: Chairperson Dowding called the meeting to order at 7:30 p.m. Voting Members present: Chairperson Chuck Dowding, Caryn Rosen Adelman, Lawson Whitesides and Charlotte McGee. Voting Members absent: Steve Scherer. A quorum of voting members was present. Ex-officio Members present: Village Council Representative Stuart McCrary. Ex-officio Members absent: Student Representative Jackson Polston. Also present, Assistant Public Works Director Steve Auth and 2 people in the audience.

1) Introduction & Chair's remarks: Chairperson Dowding stated that students would be studying the drainage swales at Crow Island Park.

2) Review and summary of Minutes; Adoption of Minutes January 8, 2014, Chairperson Dowding asked for approval of the February 12, 2014 minutes. Ms. Adelman moved to approve the minutes and Ms. McGee seconded. By voice vote, the motion carried.

3) New Business, Old Business/Updates;

Commercial District Recycling Initiative Update: Ms. Gee stated that a waste/recycling container that was reviewed for use as a trial container had several problematic functions and design issues. She stated a different container would need to be reviewed and purchased. Once an appropriate container is established and procured it will be placed in a strategic area to encourage community feedback. The committee discussed various container locations.

Environmental & Forestry Editorial Calendar for 2014: Chairman Dowding had written an introductory paragraph for the Land topic for the FEC Web. The committee reviewed and discussed the paragraph suggesting revisions. Chairman Dowding stated he would update the draft for the next meeting.

Web content draft – Water: Mr. Scherer had written a 2nd draft paragraph for the Water topic for FEC Web. The committee reviewed and discussed the paragraph and suggested further changes. Mr. Auth stated that he would note the changes and forward them to Mr. Scherer. Mr. Auth stated between them they would provide follow up draft for the Water paragraph for the next meeting.

Web Content draft – Recycling: Ms. McGee had written a draft recycling page for the FEC website. The committee discussed the paragraph and suggested changes. Ms. McGee stated she would update the Recycling page for the next meeting.

Web Content draft – Safe Drug Disposal: Mr. Auth stated that the information on the "Keep Our Water Safe with Proper Drug Disposal" flyer was posted on the Fire Department's website.

4) Committee/Staff Reports:

Safe Drug Disposal Tri-fold: Mr. Auth stated that the Safe Drug Disposal brochure would be placed at the Municipal Yards building and partner with Ms. McGee to distribute the tri-fold at local businesses as a hand-out.

IKE Disaster Recovery Grant Program Update: Mr. Auth stated that the IKE grant had been awarded to B&W Consulting for floor hazard mitigation planning.

5) Open Forum: Stuart McCrary stated the Village Council is seeking a recommendation from the FEC for consideration of a ban on the use of coal tar based sealants as a potential local environmental regulation. He stated that there are other cities and counties that already have various types of restrictions or a ban on the use of coal tar. Ms. Park-Jones, 921 Greenwood, a member of the audience stated she was somewhat familiar with polycyclic aromatic hydrocarbons or PAHs the chemical components of Coal Tar sealers of the greatest concern. She volunteered to assist the committee in an education piece on Coal Tar Sealers, its chemical composition and hazards identified with its use and possible better options for use. The committee discussed contacting various cities/counties for further information on regulation processes and enforcement. For efficiency each member agreed to reach out to communities as follows:

| | |
|---|---|
| South Barrington IL | Adelman |
| Austin TX | McGee |
| Dane County WI | Dowding |
| Montgomery County Md | Park-Jones |
| Suffolk County NY | Whitesides |

Village Council representative Stuart McGrary stated the council was targeting the June 10, 2014 study session to discuss coal tar based driveway sealers. Chairperson Dowding recommended a special meeting of the Environmental & Forestry to be held. Several dates and times were discussed with final selection being a special meeting of the Environmental & Forestry to be held 6:00pm May 7th for the purpose of discussing coal tar based driveway sealers.

6) Public Comment: Chairman Dowding introduced Mr. Wynnychenko who stated that he was very disappointed in the committee for not pursuing his request for a recommendation to the Village Council for net-metering.

7) Adjournment; There being no further business the meeting adjourned at 10:15 p.m.

# WINNETKA ENVIRONMENTAL AND FORESTRY COMMISSION

## REGULAR MEETING
## May 7, 2014

## (Approved May 14, 2014)

A record of a legally convened meeting of the Environmental and Forestry Commission of the Village of Winnetka, which was held in the Village Council Room, 510 Green Bay Rd., Winnetka, Illinois, Wednesday, May 7, 2014, at 6:00 pm.

Call to Order: Chairperson Dowding called the meeting to order at 6:00 p.m. Voting Members present: Chairperson Chuck Dowding, Caryn Rosen Adelman, Rosann Park-Jones, Lawson Whitesides and Charlotte McGee. Voting Members absent: Steve Scherer. A quorum of voting members was present. Ex-officio Members present: Village Council Representative Stuart McCrary. Ex-officio Members absent: Student Representative Jackson Polston. Also present, Assistant Public Works Director Steve Auth and 2 people in the audience.

1) Introduction & Chair's remarks: Chairperson Dowding stated that this was a special meeting to discuss coal tar based asphalt and driveway sealers. He stated that the committee would be compiling research data and background material to present a coal tar sealer recommendation to the village council. Ms. Park-Jones was welcomed as new committee member.

2) Review and summary of Minutes; Adoption of Minutes April 9, 2014, Chairperson Dowding asked for approval of the April 9, 2014 minutes. Mr. Whitesides moved to approve the minutes and Ms. McGee seconded. By voice vote, the motion carried.

3) New Business, Old Business/Updates: tabled

4) Committee/Staff Reports; Chairperson Dowding stated that the committee had contacted various cities/counties for further information on regulation processes and enforcement. For efficiency each member agreed to reach out to a designated community.

Ms. Park-Jones gave a PowerPoint presentation explaining Coal tar, polycyclic aromatic hydrocarbons or PAHs and aspects of coal tar based asphalt sealers.

Ms. McGee stated that she contacted Austin Texas and found the city to be environmentally conscientious. She stated that city inspector's target the commercial and industrial areas and parking lots. Ms. McGee stated inspectors will respond to residential areas if there is a complaint. She stated that within the last five years 3 cases of noncompliance violation have gone to court. She also stated that there is no permit required but the enforcement ordinance is supported by fines.

Mr. Whitesides stated that he reviewed material for Suffolk County in New York on their website and said that the people there are environmentally conscientious. He stated that they passed their coal tar ban in 2011. He explained enforcement is supported by fines but would research enforcement details of the ban and report back to the committee at the next meeting.

Ms. Adelman stated that she contacted South Barrington IL. She stated that the city educated their residents regarding the ban through newsletters. She stated that driveway improvements require a permit

and inspection. She explained they have adopted enforcement regulations and fines but their enforcement tool is primarily education.

Chairperson Dowding stated that he contacted Dane County WI which passed their ordinance in 2007. Chairperson Dowding explained their ordinance, fines and how the fines are levied and enforced. He stated that informational signs are used and warning letters are sent to suppliers as educational tools.

Chairperson Dowding read Mr. Scherer's report (not in attendance) from Des Plaines IL which stated that an ordinance was drafted but not passed due to the perceived difficulty of enforcement and monitoring.

Ms. Park-Jones stated that she contacted Montgomery County MD which enacted their ban on coal tar compounds in 2012. She stated that the county is adjacent to the District of Columbia which passed a coal tar ban in 2008. She stated that Montgomery County based their ban on the District of Columbia's ban. The county supports a website and a phone number for residents to report violations. She stated that the county also sends out informational/educational letters to contractors, property managers and community representatives. Ms. Park-Jones reported that Montgomery County can test pavement scrapings for coal tar compounds and if found in violation may impose fines but to date has relied heavily on education for the ban's effectiveness.

Mr. Whitesides stated that it seemed that the communities contacted support their regulation enforcement through effective education. Mr. Whitesides stated an important part of the education process to be effective in Winnetka should be informing contractors about the ban and potential monetary impacts.

Ms. Adelman stated that residents or contractors could be required to secure a permit to seal driveways and provide a list of approved applicators. Ms. Adelman stated she had been in conversation based on a proposal received with a local sealcoating contractor. The contractor acknowledged use of a commercial grade emulsion sealer blend that contained coal tar. A non-coal tar and low PAH option was said to be available with an upcharge in mid-May.

Ms. McGee stated that there should not be a permitting process. A ban supported with a high monetary fine and an education component would achieve compliance.

Mr. McCrary stated that based on the community research it appears a coal tar ban supported by educational outreach has proven successful with minimal enforcement in other areas.

Mr. McCrary stated that there may be a health component in the use of coal tar based sealants. The committee should review both sides of the topic and present evidence to the village council.

Chairperson Dowding stated that the committee had done great job gathering information and could move forward with their recommendations to the village council. Chairperson Dowding distributed Material Safety Data Sheets for coal tar compounds and discussed health effects.

5) Open Forum;

6) Public Comment; A member of the audience stated that a ban proposal was a good idea and the village council should hear all of the research and opinions that the committee has produced.

7) Adjournment; There being no further business the meeting adjourned at 9:00 p.m.

# WINNETKA ENVIRONMENTAL AND FORESTRY COMMISSION

## REGULAR MEETING
## May 14, 2014

## (Approved June 25, 2014)

A record of a legally convened meeting of the Environmental and Forestry Commission of the Village of Winnetka, which was held in the Village Council Room, 510 Green Bay Rd., Winnetka, Illinois, Wednesday, May 14, 2014, at 7:30 pm.

Call to Order: Chairperson Dowding called the meeting to order at 7:30 p.m. Voting Members present: Chairperson Chuck Dowding, Steve Scherer, Rosann Park-Jones and Lawson Whitesides. Voting Members absent: Caryn Rosen Adelman and Charlotte McGee. A quorum of voting members was present. Ex-officio Members present: Village Council Representative Stuart McCrary. Ex-officio Members absent: Student Representative Jackson Polston. Also present, Assistant Public Works Director Steve Auth and 1 person in the audience.

1) Introduction & Chair's remarks: None.

2) Review and summary of Minutes; Adoption of Minutes May 7, 2014, Chairperson Dowding asked for approval of the May 7, 2014 minutes. Mr. Whitesides moved to approve the minutes with changes to his comments that he did not make contact Suffolk County. Moreover materials were reviewed on their website and Ms. McGee seconded. By voice vote, the motion carried.

3) New Business, Old Business/Updates;

Coal tar based sealants – Chairman Dowding stated driveway seal coat contractors be mandated to complete applications for an annual seal coating permitting process similar to applying for a solicitor/peddler permit. He stated that one or two driveways could be selected yearly and tested for carcinogens. He stated that enforcement mechanism would be through fines, permitting process, testing and education. Chairman Dowding asked for a motion from the committee for a consensus to recommend to the Village Council a ban on coal tar sealants. Mr. Whitesides moved to approve the motion seconded by Mr. Scherer.

Environmental & Forestry Editorial Calendar for 2014; Chairman Dowding read the land introductory paragraph for the Environmental & Forestry Editorial Calendar. The committee discussed linking the land issue to Forestry and Plan Commission website, the paragraph would be updated for the next meeting.

Commercial District Recycling Initiative Update; Mr. Whitesides stated that the placement of the current trash containers were good, and encouraged placement of recycling containers. A member of the audience stated that a pay as you go program should be implemented to have residents pay for refuse generated thereby encouraging more recycling. The committees discussed the design of a recycling container.

Web content draft – Water; Mr. Scherer read his water topic draft for the EFC website. He stated that he would modify the introduction and reference website links for further information.

Web content draft – Recycling; The committee discussed Ms. McGee's recycling page of the WEFC website. Several minor revisions were noted including modifying references to the "Public Works Yards" as "Municipal Facility" and updating sections of the website for reference by links. Chairman Dowding asked for a motion from the committee to approve the Recycling page of WEFC website with noted changes. Mr. Whitesides moved to approve the motion seconded by Mr. Scherer.

4) Committee / Starr Reports:

Safe Drug Disposal Tri-fold; Mr. Auth stated that the prescription drug flyer is on the village's web page under the fire department and the tri-fold has been distributed to local pharmacies. Chairman Dowding asked for a motion from the committee to approve the prescription drug flyer and the Safe Drug Disposal Tri-fold. Mr. Whitesides moved to approve the motion seconded by Ms. Park-Jones.

5) Open Forum: A member of the audience asked the committee for an update of his net-metering. Chairman Dowding stated that Mr. Keys, Director of Water and Electric would need to be contacted an analysis/data presentation at a future meeting and provide direction.

6) Public Comment; None.

7) Adjournment; There being no further business the meeting adjourned at 9:00 p.m.

**ATTACHMENT #3**

# An Introduction to Understanding Coal Tar Compounds

Presented to the Winnetka Environmental and Forestry Commission

May 7, 2014

Rosann Park-Jones

# PRESENTATION OUTLINE

- What are Polycyclic Aromatic Hydrocarbons?
- What are Coal Tar Compounds?
- Coal Tar Bans in US
- Next Steps?

# What are Polycyclic Aromatic Hydrocarbons (PAHs)?

# Polycyclic Aromatic Hydrocarbons (PAHs)

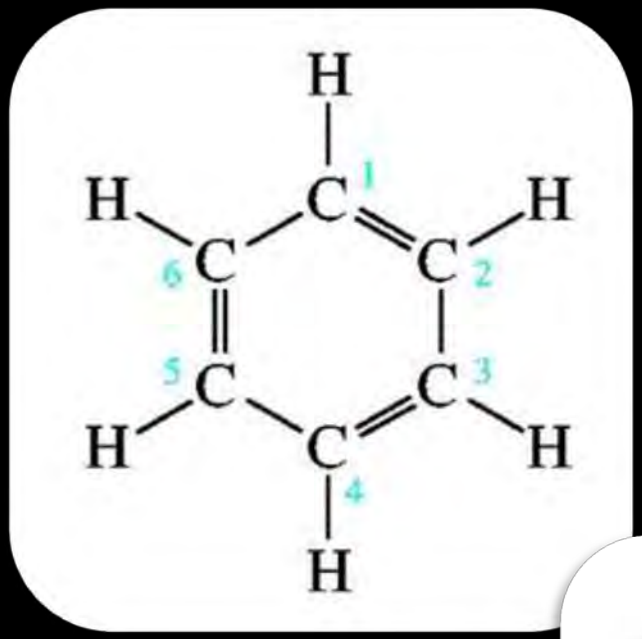
- Hydrocarbons:
  - made up of 2 or more six-carbon ringed compounds called benzene
- Organic Compounds:
  - made up of carbon
- PAHs:
  - are formed by the incomplete burning of Organic Materials (such as wood or fossil fuels)
  - Tendency to bind to sediment & organic matter
  - Thousands of different kinds of PAHs exist
  - US EPA lists 16 as Priority Pollutant PAHs

# Hydrocarbons

Hydrocarbons are found in crude oil, where decomposed organic matter provides abundant carbon and hydrogen, which forms long chains or rings

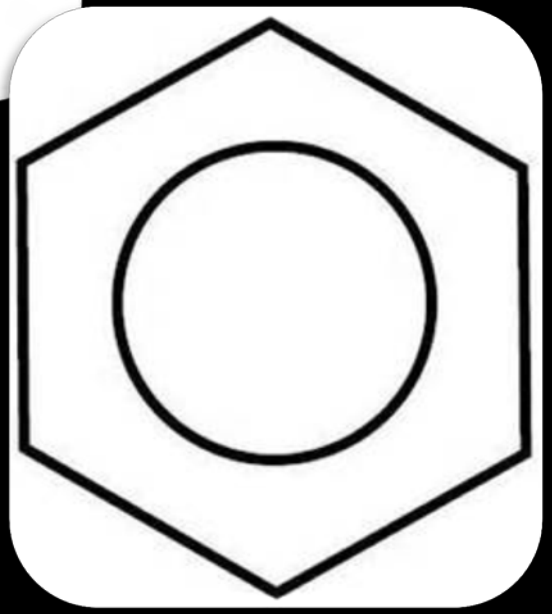
Occur as:

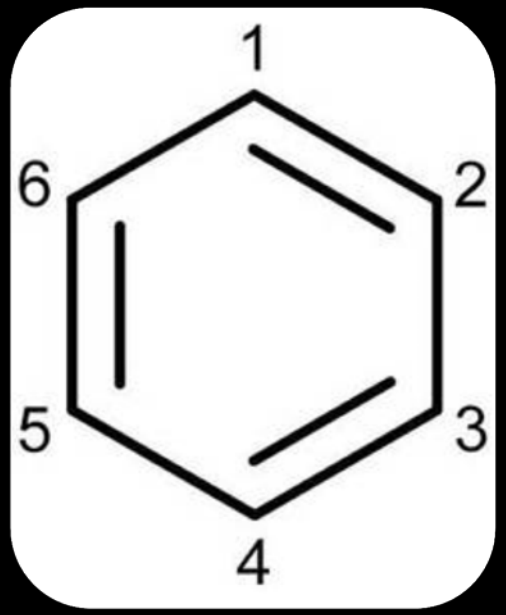
- Gases (methane, propane)
- Liquids (hexane, benzene)
- Waxes or low-melting solids (such as paraffin wax)
- Polymers (polyethylene)




# Hydrocarbons

## Contain 6-carbon rings called Benzene






$C_6H_6$formula

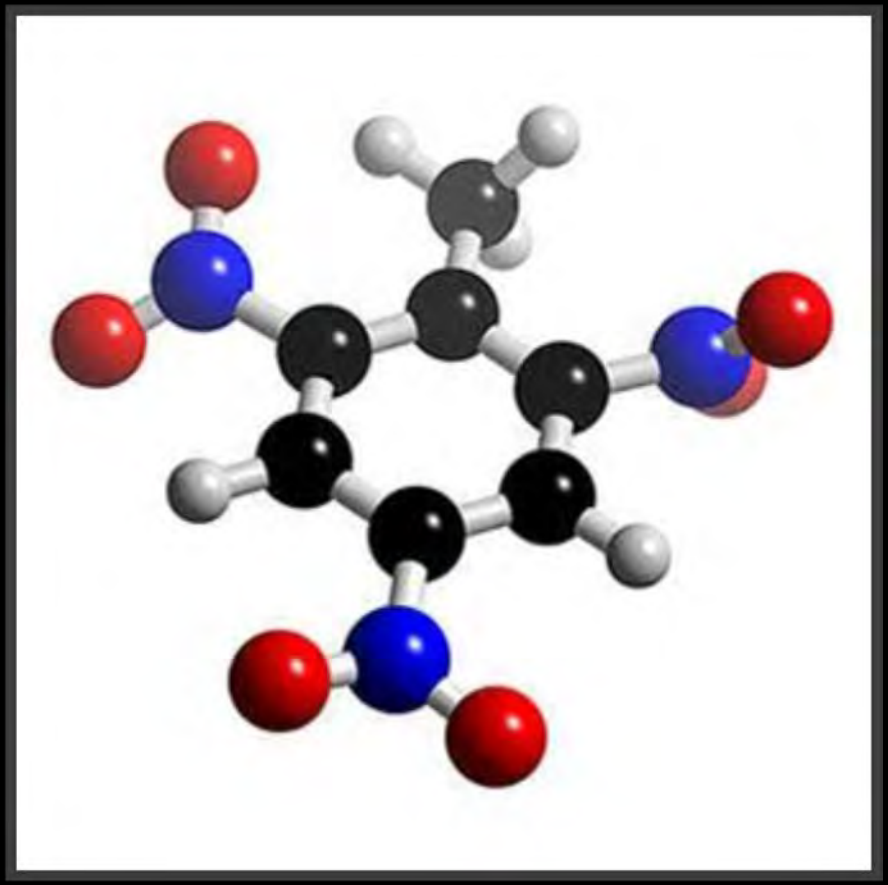
6 carbons form a ring

Naturally occurs in crude oil

**Gasoline component**

# Polycyclic Aromatic Hydrocarbons (PAHs)

- Hydrocarbons:
  - made up of 2 or more six-carbon ringed compounds called benzene
- Organic Compounds:
  - made up of carbon
- PAHs:
  - formed by the incomplete burning of Organic Materials (such as wood or fossil fuels)
  - Tendency to bind to sediment & organic matter
  - Thousands of different kinds of PAHs exist
  - US EPA lists 16 as Priority Pollutant PAHs



# Organic Compounds

Contain Carbon Atoms

# Polycyclic Aromatic Hydrocarbons (PAHs)

- Hydrocarbons:
  - made up of 2 or more six-carbon ringed compounds called benzene
- Organic Compound:
  - made up of carbon
- PAHs:
  - are formed by the incomplete burning of Organic Materials (such as wood or fossil fuels)
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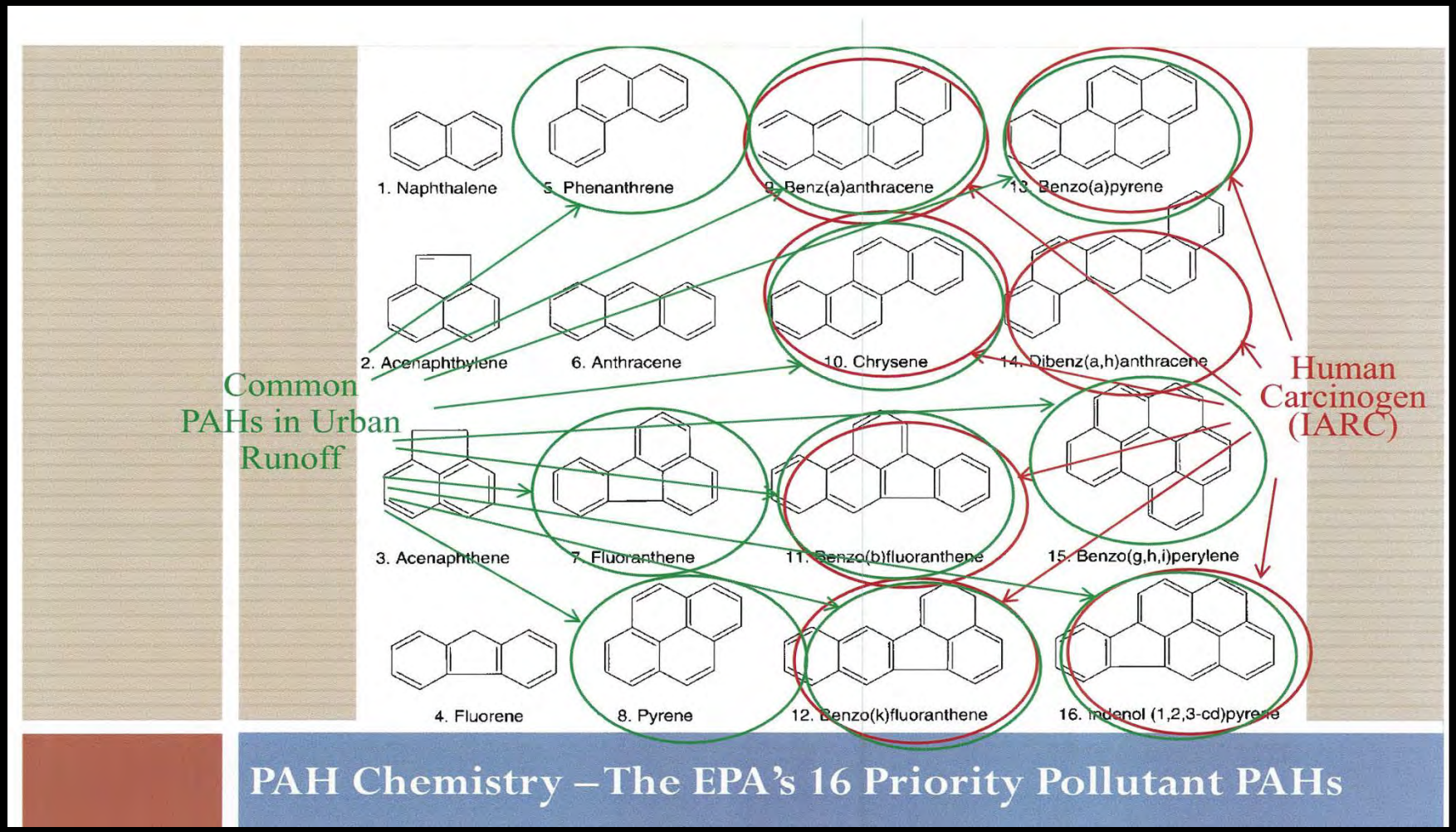
# Polycyclic Aromatic Hydrocarbons (PAHs)




***Cassandra McKinney, McHenry County , IL Dept of Planning & Development, Division of Water Resources, "Polycyclic Aromatic Hydrocarbons & Coal Tar Sealants"***

# Polycyclic Aromatic Hydrocarbons (PAHs)

- High molecular weight PAHs have > 2 benzene rings
- For humans, can be absorbed through skin, respiratory tract, gastrointestinal tract
- Are formed by the incomplete combustion of hydrocarbons, such as coal and gasoline
  - Natural Sources: forest fires, volcanic activity
  - Man-made sources: vehicle exhaust, burning of wood, coal, petroleum

# Polycyclic Aromatic Hydrocarbons (PAHs)

Illinois Regulates PAHs through the Site Remediation Program (35 IAC Part 740) and through the use of TACO (35 IAC Part 742)

- TACO stands for “Tiered Approach to Corrective Action Objectives”
- TACO regulates coal tar compounds and selected PAHs

# Polycyclic Aromatic Hydrocarbons (PAHs)—TACO

- 17 Compounds listed in TACO regulations
- Soil Remediation Objectives stated for Residential and Industrial/Commercial Properties
- Regulatory Concentrations of PAHs are listed for Chicago, Metropolitan Areas, and Non-Metropolitan Areas in Illinois

# Polycyclic Aromatic Hydrocarbons (PAHs)—TACO-Regulated Compounds

- 2-Methylnaphthalene
- Benzo(a)pyrene
- Indeno(1,2,3-c,d)pyrene
- Benzo(b)fluoranthene
- Phenanthrene
- Benzo(g,h,i)perylene
- Pyrene
- Benzo(k)fluoranthene
- Chrysene
- Acenaphthene
- Dibenzo(a,h)anthracene
- Acenaphthylene
- Fluoranthene
- Anthracene
- Fluorene
- Benzo(a)anthracene
- Naphthalene

# What is Coal Tar?

# Coal Tar Definition

- Occupational Safety & Health Administration (OSHA) in 29 CFR 1910.1002: “coal tar pitch volatiles” include the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter. Asphalt is not covered under the “coal tar pitch volatiles” standard

# Coal Tar Compounds

- Complex chemical mixture produced by destructive distillation (pyrolysis or heating) of coal.
- Pyrolysis of coal produces TAR and PITCH.
- Tar=low viscosity
- Pitch=high viscosity (semi-solid)
- Creosote can be from wood (e.g. wood creosote) or from coal (coal tar creosote)

# Coal Tar Compounds

- Coal tar is referred to by many names, including “coal tar distillates,” “crude coal tar,” “tars,” “coal tar pitch,” “coal tar creosote” and “coal tar volatiles”

# Coal Tar Compounds - Resources

- Agency for Toxic Substances & Disease Registry (ATSDR) is part of the Centers for Disease Control (CDC)
- ATSDR's Toxic Substances Portal (ToxFAQs) ™ for Polycyclic Aromatic Hydrocarbons
- US Department of Health and Human Services, Public Health Service, ATSDR, published a 2002 paper:
  - "Toxological Profile for Wood Creosote, Coal Tar Creosote, Coal Tar, Coal Tar Pitch, and Coal Tar Pitch Volatiles"

# Coal Tar used in these Industries:

- Coal tar pitch volatiles (CTPVs) created when heating of coal tar or coal tar pitch
- Industries where workers are potentially exposed to CTPVs include coking, roofing, road paving, aluminum smelting, wood preserving and any others where coal tar is used.

# Next Steps & Questions

# THANK YOU!

ATTACHMENT #4

City of Austin
WATERSHED PROTECTION

# Pavement Sealant Solvent Screening Method

Thomas Bashara, R.S. Thain Maurer and Mateo Scoggins

City of Austin
Watershed Protection Department
Environmental Resource Management Division

## Abstract

*In 2006, the City of Austin banned the use and sale of coal tar-containing parking lot sealants. The Environmental Resource Management (ERM) Division of the Watershed Protection Department was tasked with enforcement of the ban. Enforcement was complicated by difficulties in visually distinguishing applied coal tar sealants from other sealant types on parking lots. Laboratory analysis of polycyclic aromatic hydrocarbon (PAH) concentration of a sample of sealant can be used to identify coal tar containing pavement sealant, but is too expensive and time consuming to be performed on the high number of potential ban violations encountered. ERM staff used qualitative analysis techniques to develop a screening method which is fast, inexpensive, and can be used in the field. The resulting solvent screening method can generally distinguish between coal tar sealants, asphalt sealants, and sealants with a blend of coal tar and asphalt.*

## Introduction

City of Austin scientists, collaborating with the United States Geological Survey, identified coal tar-based pavement sealants as a significant source of PAH contamination in Austin area stream sediments, resulting in the implementation of a ban on the use and sale of coal tar containing parking lot sealants within the City's planning jurisdiction in January of 2006. In order to enforce this ban, routine inspections are conducted on any identified newly sealed parking lot surfaces. Visual field determinations of applied parking lot sealant types prove difficult as alternative sealants resemble banned sealants with only minor discernible differences. Laboratory analysis of pavement sealant product can be done to identify the concentration of PAH's to aid in determination of ban compliance. However, this can be costly and time consuming. Therefore, a method was developed to allow presence/absence screening for the coal tar based dried pavement sealant type at a much lower cost. This document discusses the procedure for use of this solvent method and provides guidance to the analyst conducting the procedure.

The screening method was developed using qualitative analysis techniques on known samples of asphalt pavement sealant coal tar pavement sealant. Samples of asphalt and coal tar sealants were found to have different solubility and color characteristics when exposed to a Stoddard Solvent based paint thinner. The screening method has been found to be reliable in the detection of coal tar in dried pavement sealants via color change and solubility. The screening is sensitive enough to distinguish between coal tar sealants,

asphalt sealants, and blends containing both materials. This tool is a useful first step in identifying potential violations of the ban during inspection of recently sealed parking lots.

## Materials and Methods

Overview:
A sample of the pavement sealant is collected and placed into a glass vial. Solvent is added to the vial and resulting sample solubility and color changes are observed.

Materials:

1. Nitrile Gloves
2. Eye protection
3. 10-ml glass vial with Teflon coated cap
4. 10-ml Dropper
5. **Stoddard Solvent-based paint thinner containing mineral spirits, aliphatic petroleum distillates, and white spirits to be used as solvent. ERM has conducted all screenings using Klean-Strip brand paint thinner as a solvent.**
6. Paint scraping knife with disposable single edged razor blade; a new blade should be used for each sample to prevent cross contamination.
7. Absorbent material such as clay sorbent for spill prevention and cleanup of spent solvent.
8. Shallow solvent resistant pan (e.g. stainless steel).

Method:

1. Put on gloves.
2. Put on safety glasses.
3. Add absorbent material to solvent resistant pan.
4. **Collect a small piece of the sealant material by scraping it from the surface using the knife. Care must be taken to acquire only the layer you wish to screen as older lots may have multiple layers of varying materials. Look for typical residual areas such as in depressions or cracks, along concrete curb lines, and along the edges of the lot.**
5. Place a pea-sized amount of sample into glass vial.
6. Add 5-ml of solvent via the dropper to the vial. All work with solvent should be performed above or in solvent resistant pan to prevent spills.
7. Gently agitate sample solvent for 5-30 minutes. Inconsistencies with the manufacturing of the solvent, the age of the sealant, low ambient temperatures during the screening, and fortifiers within the sealant may cause slight color and reaction time differences. When a result is in question, waiting an additional 30 minutes can be beneficial.
8. Color changes will occur depending on the constituents of sample.
    a. A translucent amber/yellow color with no significant degradation to the particles is indicative of coal tar sealant. This sample will remain in this state for months with little to no changes.
    b. A translucent red/brown color with no significant degradation to the sample is indicative blended coal tar and asphalt materials. This sample will darken over time but will remain translucent.
    c. An opaque brown/black color and degradation of the sample material is indicative of asphalt sealant.
9. Dispose of sample into a ventilated waste container containing clay sorbent. Dispose of contaminated sorbent in accordance with local and federal regulations.

## Discussion

This solvent screening is a qualitative technique, which is useful as a first step in identifying violations of the City of Austin coal tar sealant ban. While it has been found to be accurate, positive results should be verified via laboratory analysis. This field screening is designed for people knowledgeable and comfortable with solvents, and capable of adding solvent to small vials while working in an outdoor setting. Individuals not comfortable in this setting or having conflicting health problems, should inform their supervisor and refrain from this activity.

The two most common problems found when using this solvent screening technique are highlighted in the Materials (item 5) and Methods (item 4) above. First, using the correct solvent is of great importance. Using a non-Stoddard Solvent based paint thinner will likely not give results as described above. Other paint thinners were noted to give false positives or false negatives. Second, the technique involved in sample collection is important. Many paved surfaces have had a number of layers of sealant applied. Sample collection should only include the layer of interest (typically the top, most recent seal coating).

Overall, this solvent screening is just one of many tools that can be used in enforcement of the City of Austin coal tar ban. It, along with other field observations such as creosote odor, or empty containers of sealant can be used as an initial presence/absence screening for coal tar in pavement sealants. A positive result in the solvent screening should always be followed by interviewing of property owner and sealant applicator, laboratory analysis, or other methods to properly verify any violations of the coal tar sealant ban.

## Definitions

Coal tar – a tar formed during the distillation of bituminous coal; among the by-products when coal is carbonized to make coke or gasified to make coal gas.

Pavement Sealant – a uniform coating applied on top of asphalt paving; pavement sealant forms a hard coating on the porous surface of asphalt paving.

Total PAH – summed concentration of 16 commonly measured un-substituted PAHs.

## Safety Considerations

The EPA has classified seven PAH compounds as probable human carcinogens. Coal tar contains significant levels of PAHs.

The paint thinner used as a solvent has a National Fire Protection Association (NFPA) flammability rating of 2. Appropriate precautions should be taken.

Analyst should review the Material Safety Data Sheet (MSDS) specific for the solvent used for any additional safety precautions.

The screening should be performed outdoors or in a suitably ventilated area such as a fume hood.

Appropriate use of gloves and safety glasses is necessary for eye and skin protection during both the sample collection and the solvent screening.

ATTACHMENT #5

# New law bans coal tar sealers in Suffolk County

by Jennifer Gustavson |
06/11/2011 8:47 AM |

The Suffolk County Legislature on Tuesday approved a ban on the sale of coal tar sealers used on driveways and parking lots within the county.

Presiding Officer William Lindsay, who sponsored the bill, said the sealer is polluting surface waters and is harmful to humans because it contains polycyclic aromatic hydrocarbon, a known carcinogen. The new law also bans the use of the sealers.

"There is a reason why Home Depot and Lowe's have banned the sale of this substance nationwide and that is because they know the potential liability they face in selling such a toxic substance," Mr. Lindsay said in a statement, adding that Texas and Minnesota have also banned the sale and use coal tar sealers.

Prior to the vote at the Legislature's meeting in Hauppauge Tuesday, Mr. Lindsay agreed to revise the bill to exempt a chemical called "creosote," which is a derivative of coal tar used to waterproof docks.

The bill passed 11-6-0-1, with Legislators Ed Romaine, Tom Muratore, Tom Cilmi, John Kennedy and Lynne Nowick opposing. Legislator Vivian Viloria-Fisher was not present for the vote.

Mr. Romaine, who represents eastern Long Island, said he isn't convinced that an asphalt sealer, which is the proposed alternative, is safer than a coal tar sealer.

"The alternative was an inferior product that would require more sealant to be used over the years that probably would be more damaging to the environment," Mr. Romaine said. "I'm pro-environment, but before I damage and wipe out an industry I want to make sure there's compelling evidence, which I feel wasn't made."

During the public portion of the meeting, Anne LeHuray, executive director of Virginia-based Pavement Coatings Technology Council, also said she opposed the bill because she believes coal tar sealers have been "safely used for decades."

"A ban wouldn't address any problems that are known — it would only address problems that people can imagine," Ms. LeHuray said. "A ban would only harm dozens of small businesses resulting in hundreds of lost jobs."

The new law will go into effect on Jan. 1, 2012. A $500 fine will be issued for an initial offense and a $700 will be issued for any subsequent violation, according to county documents.

jennifer@northshoresun.com

# Sealant Contains Human Carcinogen, Poisons Homes, Wetlands

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**RIVERHEAD, NY** – County Executive Steve Levy today signed legislation sponsored by Presiding Officer William J. Lindsay that will ban the use of highly toxic coal tar-based sealcoat in the county. The sealcoat contains a known human carcinogen, polycyclic aromatic hydrocarbons (PAHs), and is a major polluter of wetlands and surface waters.

"Suffolk County is once again taking the lead in protecting the health and safety of our residents and of our environment," said Presiding Officer Lindsay. "With effective alternatives readily available, there is no reason to allow the use of coal tar-based sealants, which have been proven to be dangerous to humans and a severe threat to marine life of virtually every variety. I hope this will encourage the Environmental Protection Agency to ban the use of coal tar-based sealcoats nation-wide."

The ban won unanimous support from Long Island environmental groups including the Nature Conservancy, Group for the East End, Citizens Campaign for the Environment, the Long Island Pine Barrens Society and the Peconic Baykeeper. Groups that address cancer's causes also strongly supported the legislation, which was co-sponsored by Sixth District County Legislator Sarah Anker.

"I am glad that the County Executive signed this legislation, which will remove a major and dangerous pollutant from our environment," said Legislator Anker. "We have to do everything we can to stop loading potentially deadly poisons into our environment. Our health and the health of our children depend on it."

According to the United States Geologic Survey, dust on sealcoated parking lots had more than 500 times the level of the carcinogen PAH than did dust on non-sealcoated parking lots. The dust in homes near sealcoated parking lots or driveways had levels of PAH more than 25 times higher than homes near non-sealcoated parking lots or driveways. That presents a danger particularly to small children who might be playing on the floor in their homes.

"We couldn't continue to allow the use of this poisonous sealcoat in Suffolk County," said PO Lindsay. "It is a major pollutan in our waters and in our homes, and is toxic to everything that lives in our waters and wetlands."

The USGS report also showed coal tar-based sealcoat to be the major source of PAH pollution in 40 lakes studied, pointing out the dreadful effect on local waterways, many of which border roads, parking lots and driveways that are sealcoated. The only lake on Long Island that was tested, in Nassau County, showed the second highest level of PAH of all 40 lakes studied.

The City of Austin, Texas was the first community to ban the toxic sealcoat, back in 2006. Dane County, Wisconsin and Washington, D.C., have also banned its use. Washington State banned its use two months ago. Suffolk County is the second largest municipality in the country to ban the use of coal tar-based sealcoat.

Intro. Res. No. 1162-2011 Laid on Table 3/8/2011
Introduced by Presiding Officer Lindsay and Legislator Anker

**RESOLUTION NO. 440 -2011, ADOPTING LOCAL LAW NO. 27 -2011, A LOCAL LAW TO BAN THE SALE AND USE OF COAL TAR SEALERS IN SUFFOLK COUNTY**

**WHEREAS**, there was duly presented and introduced to this County Legislature at a meeting held on March 8, 2011, a proposed local law entitled, "**A LOCAL LAW TO BAN THE SALE AND USE OF COAL TAR SEALERS IN SUFFOLK COUNTY**;" now, therefore be it

**RESOLVED**, that said local law be enacted in form as follows:

**LOCAL LAW NO. 27 -2011, SUFFOLK COUNTY, NEW YORK**

**A LOCAL LAW TO BAN THE SALE AND USE OF COAL TAR SEALERS IN SUFFOLK COUNTY**

**BE IT ENACTED BY THE COUNTY LEGISLATURE OF THE COUNTY OF SUFFOLK**, as follows:

**Section 1. Legislative Intent.**

This Legislature hereby finds and determines that Suffolk County is committed to protecting the environment and the health and safety of its residents.

This Legislature also finds and determines that Suffolk County is located on a sole source aquifer which supplies the County's drinking water.

This Legislature further determines that coal tar sealer is a waste product from steel manufacturing which is used to protect pavement and asphalt against water damage and cracking.

This Legislature finds that parking lot sealers made with a coal tar base contain large quantities of polycyclic aromatic hydrocarbons ("PAHs"), a known carcinogen.

This Legislature determines that PAHs are known to cause asthma and other ailments in children exposed to high concentrations of the chemical.

This Legislature also finds that PAHs are present in high amounts in many waterways, as it can seep into groundwater and nearby waterways and enter the run-off stream from coal tar sealed asphalt. Animals exposed to PAHs in water, including frogs and insects, have shown stunted growth, with most dying shortly after exposure to high concentrations of the chemicals.

This Legislature further finds that PAHs from coal tar asphalt sealers not only wear off with friction, but also evaporate into the atmosphere, which allows them to enter the air and combine with household dust.

This Legislature also determines that ground floor residential spaces located near coal tar sealed parking lots have been tested for PAHs and have pollution levels twenty five times higher than those with parking lots coated with other sealers.

This Legislature further determines that drainage ditches near some coal tar sealed lots have also been found to have higher PAH levels than found at toxic waste sites and severely polluted waterways.

This Legislature finds that, in recognition of the dangers posed by coal tar sealers, Lowes and Home Depot have discontinued the sale of such products at their stores nationwide.

This Legislature determines that municipalities throughout the nation, including many in Texas and Minnesota, have banned the sale and use of coal tar sealers in their jurisdictions.

This Legislature also finds that asphalt and latex based sealants are safe alternatives to coal tar sealers and do not contain any PAHs.

Therefore, the purpose of this law is to ban the sale and use of coal tar sealers in the County of Suffolk.

**Section 2. Definitions.**

As used in this law, the following terms shall have the meaning indicated:

"ALTERNATIVE BASED SEALER" shall mean any sealer material that does not contain coal tar and is used on asphalt or concrete surfaces, including a driveway, parking lot or other paved surface.

"COAL TAR" shall mean a viscous substance obtained by the destructive distillation of coal and containing levels of polycyclic aromatic hydrocarbons in excess of ten thousand milligrams per kilogram. This definition shall include, but not be limited to, refined coal tar, high temperature coal tar, coal tar pitch, or any substance identified by chemical abstract number 65996-93-2.

"COAL TAR SEALER" shall mean a sealer material containing coal tar that is used on an asphalt or concrete surface, including a driveway, parking lot or other paved surface.

"COMMISSIONER" shall mean the Commissioner of the Department of Health Services.

"PAHs" shall mean polycyclic aromatic hydrocarbons, a group of organic chemicals which are formed during the incomplete burning of coal, oil, gas or other hydrocarbons. These chemicals are present in coal tar and are known to be harmful to humans, fish and other aquatic life.

"PERSON" shall mean any natural person, individual, corporation, unincorporated association, proprietorship, firm, partnership, joint venture, joint stock association, or other entity or business organization of any kind.

**Section 3. Prohibitions.**

A. No person shall sell or offer for sale any coal tar sealer in the County of Suffolk.

B. No person shall apply any coal tar sealer to any driveway, parking lot or other surface within the County of Suffolk.

**Section 4. Exemptions.**

A. This law shall not apply to any person who is conducting bona fide research on the effects of coal tar sealer products or PAHs on the environment with the written consent of the Commissioner.

B. This law shall apply only to the sale and use of coal tar sealers and shall not affect the use of alternative based sealers or other alternatives that do not contain PAHs in the County of Suffolk.

**Section 5. Penalties.**

Violation of this law shall be subject to a civil fine of five hundred dollars ($500.00) for an initial violation, with a penalty of seven hundred fifty dollars ($750.00) for any subsequent violations.

**Section 6. Enforcement and Investigations.**

A. This law shall be enforced by the Department of Health Services in accordance with the procedures set forth in §760-202 through 760-215 of the Suffolk County Sanitary Code.

B. The Department of Consumer Affairs is hereby authorized and empowered to investigate alleged violations of this law upon the request of the Commissioner. Upon the completion of an investigation, the Department of Consumer Affairs shall forward its findings to the Commissioner.

**Section 7. Rules and Regulations.**

The Commissioner is hereby authorized and empowered to establish rules and regulations necessary for the implementation of this law.

**Section 8. Applicability.**

This law shall apply to all actions occurring on or after the effective date of this law.

**Section 9. Severability.**

If any clause, sentence, paragraph, subdivision, section, or part of this law or the application thereof to any person, individual, corporation, firm, partnership, entity, or circumstance shall be adjudged by any court of competent jurisdiction to be invalid or unconstitutional, such order or judgment shall not affect, impair, or invalidate the remainder thereof, but shall be confined in its operation to the clause, sentence, paragraph, subdivision, section, or part of this law, or in its application to the person, individual, corporation, firm, partnership, entity, or circumstance directly involved in the controversy in which such order or judgment shall be rendered.

**Section 10. SEQRA Determination.**

This Legislature, being the State Environmental Quality Review Act (SEQRA) lead agency, hereby finds and determines that this law constitutes a Type II action pursuant to Section 617.5(c)(20), (21), and/or (27) of Title 6 of the NEW YORK CODE OF RULES AND REGULATIONS (6 NYCRR) and within the meaning of Section 8-0109(2) of the NEW YORK ENVIRONMENTAL CONSERVATION LAW as a promulgation of regulations, rules, policies, procedures, and legislative decisions in connection with continuing agency administration, management and information collection. The Suffolk County Council on Environmental Quality (CEQ) is hereby directed to circulate any appropriate SEQRA notices of determination of non-applicability or non-significance in accordance with this law.

**Section 11. Effective Date.**

This law shall take effect on January 1, 2012.

DATED: June 7, 2011

APPROVED BY:

County Executive of Suffolk County

Date: 7/8/11 JUL 0 8 2011

After a public hearing duly held on June 22, 2011
Filed with the Secretary of State on July 28, 2011

**COUNTY OF SUFFOLK**

**OFFICE OF THE COUNTY EXECUTIVE**

**Steve Levy**
COUNTY EXECUTIVE

July 7, 2011

Presiding Officer William J. Lindsay and
Members of the Suffolk County Legislature
William H. Rogers Legislative Building
725 Veterans Memorial Highway
Smithtown, New York 11787

**RE: RESOLUTION NO. 187 – 2011, ADOPTING LOCAL LAW NO. -2011, A LOCAL LAW TO BAN THE SALE AND USE OF COAL TAR SEALERS IN SUFFOLK COUNTY.**

Dear Presiding Officer Lindsay and Members of the Legislature:

I am returning herein **RESOLUTION NO. 187 – 2011, ADOPTING LOCAL LAW NO. -2011, A LOCAL LAW TO BAN THE SALE AND USE OF COAL TAR SEALERS IN SUFFOLK COUNTY**; signed.

Despite the fact that I am returning this bill signed I do still have some reservations that implementing this legislation too quickly could potentially hurt many of the businesses in this industry which will have little time to adjust to this ban.

I have reached an understanding with the Presiding Officer, who has agreed to introduce an amendment to this legislation which would delay the implementation for an additional six months. This will provide the industry an opportunity to transition to newer environmentally friendly products, while phasing out the use of coal tar sealers. It is my hope that a phased in approach will mitigate any undue financial burden placed on the industry as a result of this legislation, while also providing them with time to service patrons with the more environmentally acceptable products.

I am, therefore, returning the following piece of legislation signed.

Sincerely,

Steve Levy
County Executive of Suffolk County

LOCATION
H. LEE DENNISON BUILDING, 12th FLOOR
100 VETERANS MEMORIAL HIGHWAY

MAILING ADDRESS
P.O. BOX 6100
HAUPPAUGE, NY 11788-0099

OFFICE (631) 853-4000
FAX (631) 853-4818

cc: All Suffolk County Legislators
Tim Laube, Clerk of the Legislature
Christine Malafi, Esq., Suffolk County Attorney
Lynne A. Bizzarro, Esq., Chief Deputy County Attorney
Christopher Kent, Chief Deputy County Executive
Edward Dumas, Chief Deputy County Executive
Eric Naughton, Deputy County Executive for Finance and Management
Ken Crannell, Deputy County Executive
Connie Corso, Budget Director
Eric Kopp, Assistant Deputy County Executive
Dan Aug, Director of Communications
Mark Smith, Deputy Director of Communications

SUFFOLK COUNTY
County Legislature
RIVERHEAD, NY

*This is to Certify That I,* TIM LAUBE, Clerk of the County Legislature of the County of Suffolk, have compared the foregoing copy of resolution with the original resolution now on file in this office, and which was duly adopted by the County Legislature of said County on June 7, 2011 and that the same is a true and correct transcript of said resolution and of the whole thereof.

*In Witness Whereof, I* have hereunto set my hand and the official seal of the County Legislature of the County of Suffolk.

Tim Laube

Clerk of the Legislature

Intro. Res. 1162 Res. No. 440 June 7, 2011

**Motion:**
Romaine, Schneiderman, Browning, Muratore, Anker
Eddington, Montano, Cilmi, Lindsay, Viloria-Fisher, Barraga,
Kennedy, Nowick, Horsley, Gregory, Stern, D'Amaro, Cooper

**Co-Sponsors:**
Romaine, Schneiderman, Browning, Muratore, Anker
Eddington, Montano, Cilmi, Lindsay, Viloria-Fisher, Barraga,
Kennedy, Nowick, Horsley, Gregory, Stern, D'Amaro, Cooper

**Second:**
Romaine, Schneiderman, Browning, Muratore, Anker
Eddington, Montano, Cilmi, Lindsay, Viloria-Fisher, Barraga,
Kennedy, Nowick, Horsley, Gregory, Stern, D'Amaro, Cooper

| LD | Legislator | Yes | No | Abs | NP | R |
|---|---|---|---|---|---|---|
| 1 | Edward P. ROMAINE | | ✓ | | | |
| 2 | Jay H. SCHNEIDERMAN | ✓ | | | | |
| 3 | Kate M. BROWNING | ✓ | | | | |
| 4 | Thomas MURATORE | | ✓ | | | |
| 6 | Sarah S. ANKER | ✓ | | | | |
| 7 | Jack EDDINGTON | ✓ | | | | |
| 9 | Ricardo MONTANO | ✓ | | | | |
| 10 | Thomas CILMI | | ✓ | | | |
| 11 | Thomas F. BARRAGA | | ✓ | | | |
| 12 | John M. KENNEDY, JR. | | ✓ | | | |
| 13 | Lynne C. NOWICK | | ✓ | | | |
| 14 | Wayne R. HORSLEY | ✓ | | | | |
| 15 | DuWayne GREGORY | ✓ | | | | |
| 16 | Steven H. STERN | ✓ | | | | |
| 17 | Lou D'AMARO | ✓ | | | | |
| 18 | Jon COOPER | ✓ | | | | |
| 5 | Vivian VILORIA-FISHER, D.P.O. | | | | ✓ | |
| 8 | William J. LINDSAY, P.O. | ✓ | | | | |
| | Totals | 11 | 6 | - | 1 | - |

**MOTION**

X Approve
___ Table: ___
___ Send To Committee
___ Table Subject To Call
___ Lay On The Table
___ Discharge
___ Take Out of Order
___ Reconsider
___ Waive Rule ___
___ Override Veto
___ Close
___ Recess

APPROVED X FAILED ___
No Motion ___ No Second ___

**RESOLUTION DECLARED**

X ADOPTED
___ NOT ADOPTED

Roll Call ___ Voice Vote X

Tim Laube
Tim Laube, Clerk of the Legislature

ATTACHMENT #6

# ORDINANCE NO. 2012- 961

## AN ORDINANCE AMENDING TITLE 4 OF THE VILLAGE OF SOUTH BARRINGTON CODE OF ORDINANCES REGULATING THE APPLICATION AND SALE OF COAL TAR SEALCOAT PRODUCTS

**WHEREAS,** the Corporate Authorities find that Village's water resources are a natural asset, which enhance the environmental, recreational, cultural and economic resources of the area and contribute to the general health and welfare of the public.

**WHEREAS,** the Corporate Authorities further find that polycyclic aromatic hydrocarbons (PAHs), which are contained in coal tar sealants, can be carried by storm water and other run off into the water resources of the Village of South Barrington.

**WHEREAS,** the Corporate Authorities further find that PAHs are harmful to aquatic life and human health

**WHEREAS,** the Corporate Authorities further find that environmental impacts can be minimized and pavements can be maintained by utilizing alternative products, absent PAHs.

**WHEREAS,** the Corporate Authorities further find that regulating the amount of contaminants, including PAHs contained in coal tar sealcoat products, entering the water resources of the Village of South Barrington will improve and protect the water quality of the Village of South Barrington and neighboring water resources.

**NOW, THEREFORE,** be it ordained by the Village President and Board of Trustees of the Village of South Barrington, Illinois, as follows:

**SECTION 1:** Title 4 of the Village of South Barrington Code of ordinances is amended to add a new Chapter 16 to read as follows:

## CHAPTER 16. COAL TAR PAVEMENT PRODUCTS

### 16-1: DEFINITIONS.

(1) COAL TAR is a byproduct of the process used to refine coal. Coal tar contains high levels of polycyclic aromatic hydrocarbons (PAHs).

(2) COAL TAR PAVEMENT PRODUCT means a material that contains coal tar and is for use on an asphalt or concrete surface, including a driveway or parking area.

(3) POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) are a group of organic chemicals that are present in coal tar and are an environmental concern because they are toxic to aquatic life.

(4) SEALCOAT is a black liquid that is sprayed or painted on asphalt pavement in an effort to protect and beautify the asphalt. Most sealcoat products are coal tar or asphalt based.

**16-2: ENFORCEMENT.**

Violations of this ordinance will be enforced by the Village of South Barrington.

**16-3: REGULATION OF THE APPLICATION OF SEALCOAT PRODUCTS CONTAINING COAL TAR.**

(1) No person shall apply any coal tar containing sealcoat product within the Village of South Barrington.

(2) A person who owns property on which a coal tar pavement product is used is presumed to have used a coal tar pavement product in violation of this section.

**16-4: PENALTY.**

Violation and Penalty. Any violation of any provision of this section shall constitute a municipal civil infraction subject to the remedies specified in Title 1, Chapter 4 - General Penalty of this ordinance.

**SECTION 2:** Any ordinance, or portion of any ordinance, in conflict with the provisions of this ordinance is expressly repealed solely to the extent of said conflict.

**SECTION 3:** This Ordinance shall be in full force and effect from and after its passage, approval and publication in the manner as provided by law.

APPROVED by the President and Board of Trustees of the Village of South Barrington, Cook County, Illinois.

PASSED: This 12th day of April, 2012

APPROVED: This 12th day of April, 2012

ATTEST:

Donna Wood, Village Clerk

APPROVED:

Frank J. Munao, Jr., Village President

AYES: 5 NAYS: 1 ABSTAIN: ϕ ABSENT: ϕ

PUBLISHED: 4/16/2012

ATTACHMENT #7

## Dane County, WI

1) General community history relative to coal tar.
   Banned coal tar at the county level in 2007 and have documented well their experience

2) Does the community have an ordinance relative to coal tar?
   Yes; see following pages.

3) When was the ordinance enacted?
   2007

4) How many hearings were held? Was there an industry representative present?
   Did not ask

5) Have any tickets/fines been levied? Whom to? Contractors? Homeowners?
   Fines:
   - Homeowners: $100 per occurrence
   - Applicators: $500 first offense, $1000 second, $2000 third

   Log of sales and notice to purchasers
   - The only supplier left the county rather than comply with the exemption reporting requirements (form is attached but can be found on Coal Tar web site )

   Early on, owners of large parking lots would pay the fines for the applicators employing coal tar sealer.

6) What plans are there for public education about alternatives?
   See the attached informational signs which can be found by following links on
   http://danewaters.com/business/coalTar.aspx.

7) Are program materials or educational materials employed? Are they available?
   Attached warning letters are sent to suppliers about notifications to be posted at stores

8) How is the program evaluated for effectiveness?
   Lack of supply is presumed to have greatly reduced the activity
   See attached compliance history log from Wenta.
   See attached enforcement report from Wneta.

9) Who is the most knowledgeable contact on this topic? Staff? May we contact?
   Rick Wenta of Dane County Health Dept. RWenta@publichealthmdc.com
   Roger Bannerman: Former WI DNR expert on Urban Run Off. rtbannerman@gmail.com
   - Sent thumb drive of info (to be given to Steve A)

10) Is there follow up action anticipated?
    No

List of Attachments

Coal Tar Sealer Exemption Form (required to be maintained by all those selling products with coal tar)

Flyer for public display sent yearly to all suppliers of sealers

Coal Tar Ban Enforcement Report (describes the details of enforcement)

Coal Tar Compliance History Log (from Wenta)

Letter Sent Yearly to all suppliers notifying them of need to maintain the exemption form

Background report available on Coal Tar Ban web site

Ordinance

# DRIVEWAY SEALANTS *WITHOUT COAL TAR* MEAN CLEANER LAKES

***The application of coal tar sealcoat products on driveways, parking lots and all other paved surfaces in Dane County is prohibited by section 80.08 of the Dane County Code of Ordinances. Also prohibited are sale or retail display of sealcoat products containing coal tar.***

## Sealcoat products containing coal tar add pollutants to our lakes

**Coal tar is a significant source of polycyclic aromatic hydrocarbons (PAHs)**, a group of organic chemicals that can be carried by stormwater and other runoff into Dane County's lakes and streams. PAHs are an environmental concern because they are toxic to aquatic life.

## There are safer alternatives to use

**Asphalt sealcoat and latex modified asphalt sealer are two safer products** that you can use in your projects. Check the label and don't buy products containing coal tar.

## For more information

**Dane County Office of Lakes and Watersheds**
www.danewaters.com/business/coalTar.aspx — 608/224-3758

***INFORMATION FOR CONSUMERS ON DANE COUNTY'S SEALCOAT PRODUCTS ORDINANCE***
*This information provided in accordance with Section 80.08 of the Dane County Code of Ordinances.*

Print Form

# COAL TAR SEALCOAT EXEMPTION FORM

**(To Be Used for Sales Of Sealcoat Products To Purchasers Who Will Use Product Outside Of Dane County)**

| PURCHASER NAME (Please print) | ADDRESS (street city, state, ZIP) | PHONE | DATE OF PURCHASE | QUANTITY PURCHASED | SIGNATURE OF PURCHASER (confirms that purchaser will not apply coal tar sealcoat product on a surface located within Dane County) |
|---|---|---|---|---|---|
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Under section 80.09 Dane County Code of Ordinances, retailers who sell sealcoat products containing coal tar, must require purchasers who intend to apply the product on a surface outside Dane County to sign this form. Retailers must retain the completed form for three (3) years from the date of sale, and allow inspection and copying of the form by Dane County staff.

RETAIL ESTABLISHMENT: _____ STORE MANAGER: _____

# COAL TAR BAN ENFORCEMENT

The first complaint of coal tar use was received on July 29, 2008. The complaint was submitted by a competitor of the contractor. The contractor was aware of the ban and accused the complainant of harassing his workers. An MSDS was obtained that described the material as an asphaltic emulsion. Thus, the case was closed.

On August 12, 2008 another complaint was received. The applicator was aware of the ban and was following it. His supplier was also contacted. He was aware of the ban and provided an MSDS that described the material as an asphaltic emulsion and made no mention of coal tar. This case was closed.

A complaint was received on July 19, 2009 from another seal coat contractor. He complained that a large parking lot had been seal coated with coal tar. Again, we could find no evidence of coal tar use. However, the complainant was positive that the material was coal tar, as he was aware of the material's properties, and knew where the material was obtained. After extensive internet research, the City of Austin, Texas was contacted for advice. They provided us with a field screening method that is very reliable. This information provided the means to meaningfully pursue violations of the ordinance.

Once we had a method for confirming the presence of coal tar, we were able to determine that the seal coat used in the above complaints, and in other instances, was coal tar. We currently have several cases referred to corporate council for prosecution.

A current investigation concerns one contractor that has apparently applied coal tar sealant in at least four separate cases (even though he received a warning letter at the beginning of the year). However, he has submitted an MSDS that does not indicate a coal tar component. We have since learned from the Austin, Texas investigators that he may be using an uncommonly high quality asphalt that contains a large rubber component that confounds the test.

Current Issues:

- Some contractors are angry because they perceive coal tar as a superior product and some applicators are continuing to use it, while they are complying with the law.
- Some contractors are angry because they understand coal tar is harmful to the environment, yet some applicators continue to use it without any action being taken.
- The fines are too low to act as a deterrent. Two contractors have stated that some applicators and clients perceive coal tar to be a superior product and are willing to pay the fine to have the material applied.

[redacted]

- Although our field screening method is reliable and repeatable, lab analysis for PAH's is still required for prosecution in some cases. This analysis is expensive ($300-$400), so we need cost recovery language in the ordinance, or money budgeted for this purpose.
- We have found coal tar listed on the Material Safety Data Sheet only once in about eight cases where coal tar or a coal tar blend was used.
- We currently have three open cases of coal tar applications on six sites.

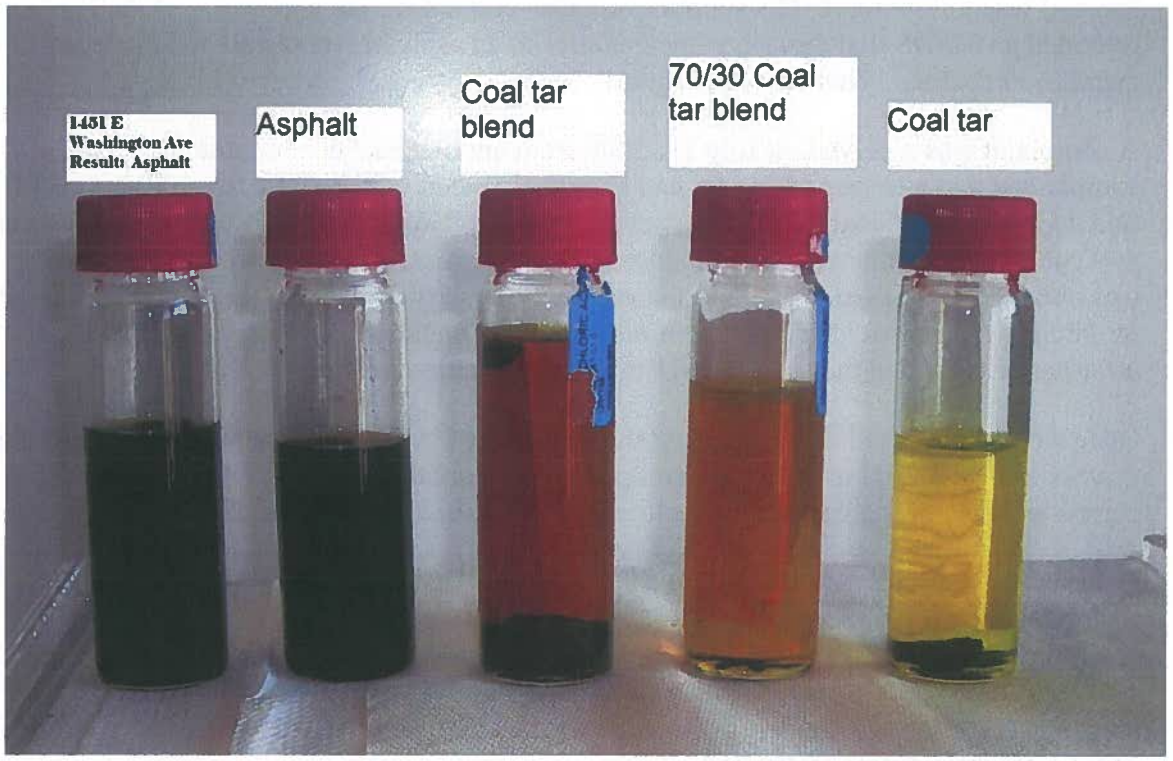


**Illustration of field screening method-Asphalt dissolves and produces a "coffee" appearance. Coal tar does not dissolve, but yields a yellow color. A blend of asphalt and coal tar results in the asphalt fraction dissolving; thus a reddish "tea" appearance is formed.**

**Coal tar sealant accumulation in gutter-The gutter of this parking lot was covered with fine particles of sealant after tires abraded the freshly laid material. Two days of traffic followed by an half inch of rain produced these deposits.**

Notes from Austin on detecting coal tar:

1. 3% naphthalene in asphalt
2. 6% naphthalene in coal tar
3. Naphthalene odors persist (in Texas) for 1-2 years when coal tar is used.
4. A background search on the parent company (sealant supplier) may provide a clue to the material used.
5. High end asphalt emulsion (type that produces a coal tar type result with solvent) is expensive.
6. Austin weighs the effectiveness of removal vs. resealing when coal tar sealant is discovered.
7. Shot blasting and removing with a hepa filter is about 50¢ a square foot.

# Coal Tar

8/8/08-University Ave business

- Sealcoat contractor complains of a competitor using coal tar.
- Applicator claims harassment, says he is using asphalt.
- MSDS does not mention coal tar.
- Material later confirmed to be coal tar.

8/12/08-Private residence in Town of Middleton.

- Contractor claims asphalt.
- Supplier, Sherwin Industries, claims asphalt (later verified as coal tar).
- MSDS does not mention coal tar.

7/16/09-[redacted] Verona Rd

- Sealcoat contractor complains of a competitor using coal tar.
- Applicator is aware of ban and claims he is using asphalt.
- [redacted] Industries is the supplier, MSDS indicates asphaltic product.
- [redacted] Industries admits product is a coal tar blend.
- [redacted] Industries complies with Chapter 80 sale restrictions.

8/25/09-[redacted] Verona Ave

- Suspected coal tar application verified as asphalt through field screen.

11/3/09-Village of Blooming Grove

- Contractor bought coal tar from known vendor.
- Contractor rinsed out tank and excess sealant into Starkweather Creek.
- WDNR issued a littering citation.

1/1/10

- [redacted] Industries stops selling coal tar in Dane County.

6/1/10-[redacted] of Verona

- MSDS verifies coal tar.
- Contract specifies asphalt.

6/4/10-Advertisement

- Competitor complains a contractor has a *Shopper Stopper* ad in Dane County claiming he uses a coal tar sealer.
- Contractor pulled advertisement.

Summer of 2010

- The contractor from the above incident made numerous complaints of another contractor using coal tar. Research is inconclusive, but suggests high grade asphalt was used.

- [redacted] Verona Road contract was for $16,700. Fine would be $50.
- MSDS does not always indicate coal tar. Investigation time is considerable if field screen is positive, but MSDS is negative.

Public Health
MADISON & DANE COUNTY
*Healthy people. Healthy places.*

Janel Heinrich, MPH, MA, Director

City-County Building, Room 507
210 Martin Luther King, Jr. Boulevard
Madison, WI 53703

608 266-4821
608 266-4858 fax
www.publichealthmdc.com

Date

Company Name
Street
City

**RE: DANE COUNTY COAL TAR SEALCOAT PRODUCTS BAN**

Dane County Code of Ordinances Chapter 80.08 bans the application of coal tar sealants in Dane County. Any commercial sealcoat product applicator that violates Chapter 80.08 shall be subject to a forfeiture of $500 for the first violation within a twelve month period, $1000 for the second violation within a twelve month period, and $2000 for the third and each subsequent violation within a twelve month period.

The sale of all sealcoat products that are labeled as containing coal tar is restricted within Dane County. The sale of a sealcoat product containing coal tar intended for use outside Dane County is permitted. The following conditions apply:

1. The seller requires the purchaser to complete and sign the form from the Land and Water Resources Department (http://pdf.countyofdane.com/lwrd/lakes/retailerExemption.pdf).
2. The seller retains the completed form for a period of not less than three years from the date of sale and allows the inspection and copying of the form by Dane County staff upon request.

Additionally, any retailer that sells any pavement sealcoat products shall prominently display, in the area where such products are sold, a notice that contains Dane County's warning on the use of coal tar sealcoat. A suitable poster can be obtained here: http://pdf.countyofdane.com/lwrd/lakes/coalTarFlyer.pdf.

Further information is available at: http://danewaters.com/business/coalTar.aspx. If you have any questions contact Dane County Lakes and Watersheds: 608-224-3730 or Public Health-Madison and Dane County 608-266-4821.

# Proposed Dane County Ordinance Amendment to Prohibit the Sale or Use of Coal Tar Sealcoat Products

## Overview

Recent studies show that coal tar sealcoat products used as a means to protect asphalt pavement is a significant source of Polycyclic Aromatic Hydrocarbon (PAH) contamination in our lakes and streams. Studies in Austin, TX and Puget Sound near Olympia, WA demonstrate that the PAH compounds run off into lakes and streams and are toxic to fish. Dane County Executive Kathleen Falk asked the Lakes & Watershed Commission to examine the issue and take the necessary steps to protect our waterways from this threat.

In the summer of 2006, the Lakes and Watershed Commission formed a task force to examine the issue. Task force members included two LWC commissioners, Carl Sinderbrand and Patrick Miles, Roger Bannerman, DNR expert on urban runoff and Genesis Bichanich, City of Madison Engineering. Bannerman had already found elevated levels of PAH in storm sewers that empty into our lakes. The task force researched the prevalence of coal tar products in Dane County and reviewed existing research that demonstrates adverse environmental impacts.

The task force found that, due to various market conditions, coal tar sealcoat availability is low at the present time. State and local governments, including Dane County, do not use coal tar products. However, until recently, as much as 300,000 gallons of coal tar product were applied to parking lots in Dane County each year or enough material to apply two coats to about 330 acres of parking lot.

Given research that shows coal tar sealcoat to be a significant source of PAHs appearing in water resources, the prevalence of use historically in the county and that there are safer alternative products, the task force recommended to the Lakes & Watershed Commission an ordinance amendment prohibiting the sale or use of coal tar sealcoat products in Dane County.

## Quick Facts

### Polycyclic Aromatic Hydrocarbon Compounds Are Harmful to Aquatic Life

- Austin biological studies revealed a loss of species and decreased number of organisms.
- Puget Sound Ambient Monitoring Program found the following related to the presence of PAHs:
  - Liver lesions and tumors in fish.
  - Liver problems led to reproductive impairment.
  - Malformations in fish embryos and embryonic cardiac dysfunction.
  - Reduction in aquatic plants (Eelgrass) that provide fish habitat.

### Coal Tar Sealcoat a Significant Source of PAHs

- Coal Tar Sealcoat products contain as much as 30% coal tar by weight.
- Coal tar contains 50% or more PAHs by weight
- Friction of automobile tires causes sealcoat to flake off. Precipitation running off surfaces carries the particles into storm sewers that empty into lakes and streams.
- City of Ausitn, TX and USGS collaborated on study: Parking lots with coal-tar sealcoat yielded 65 times more PAH than unsealed lots in simulated rain events.

### Coal Tar & PAHs Prevalent in Dane County

- It takes about 450 gallons of sealcoat to apply a single coat to one acre of parking lot. Typically two coats are applied. In Madison, there are about 4,000 acres of parking lots.
- Applicators suggest reapplication of sealcoat every two to three years.
- Four out of five private applicators interviewed by the task force use coal tar sealcoat when available.
- Three out of four suppliers interviewed by the task force sell coal tar sealcoat (or a blend with asphalt sealcoat) when available.
- Historically, as much as 300,000 gallons of coal tar sealcoat applied to parking lots in Dane County annually.
- Concentrations of PAHs found in Madison storm sewers that empty into lakes and streams

### Alternative Products Available

- Asphalt sealcoat
- Latex modified asphalt sealer (Master Guard®)

### Resources on the Web

- http://pubs.usgs.gov/fs/2005/3147
- www.ci.austin.tx.us/watershed/coaltar_main.htm
- http://wdfw.wa.gov/conservation/research/projects/marine_toxics/study_design.html
- http://wdfw.wa.gov/conservation/research/projects/marine_toxics/contaminants.html
- http://www.nwfsc.noaa.gov/research/divisions/ec/ecotox/fishneurobiology/cardio.cfm

# CHAPTER 80
# ESTABLISHING REGULATIONS FOR LAWN FERTILIZER AND COAL TAR SEALCOAT PRODUCTS APPLICATION AND SALE


80.01 Authority.
80.02 Purpose And Intent.
80.03 Applicability.
80.04 Definitions.
80.05 Regulation Of The Use And Application Of Law Fertilizer.
80.06 Exemptions.
80.07 Sale of Fertilizer Containing Phosphorus.
80.08 Regulation Of The Application And Sale Of Sealcoat Products Containing Coal Tar.
80.09 Exemptions.
80.10 Enforcement.
80.11 Penalty.
80.12 Severability Clause.
*[80.13 – 80.99 reserved.]*


**80.01 AUTHORITY.** This chapter is recommended by the Dane County Lakes and Watershed Commission and adopted by the Dane County Board of Supervisors under the authority of sec. 33.455, Wis. Stats.

**80.02 PURPOSE AND INTENT.** The Dane County Board of Supervisors finds that Dane County's lakes and streams are a natural asset which enhance the environmental, recreational, cultural and economic resources of the area and contribute to the general health and welfare of the public. The Board further finds that regulating the amount of nutrients and contaminants, including phosphorus contained in fertilizer and polycyclic aromatic hydrocarbons (PAHs) contained in coal tar sealcoat products, entering the lakes will improve and maintain lake water quality.
[**History:** am., OA 34, 2006-07, pub. 04/19/07, eff. 07/01/07.]

**80.03 APPLICABILITY. (1)** This ordinance applies in all areas of Dane County.
**(2)** Cities and villages wholly or partially in Dane County may assume administration and regulation of lawn fertilizer and coal tar sealcoat products application and sale if they have adopted ordinances that include standards at least as restrictive as those described in ss. 80.05 – 80.09.
[**History:** (2) am., OA 34, 2006-07, pub. 04/19/07, eff. 07/01/07.]

**80.04 DEFINITIONS. (1)** *Agricultural use* has the meaning set forth in sec. 10.01(2a).
**(2)** *Coal tar* is a byproduct of the process used to refine coal. *Coal tar* contains high levels of polycyclic aromatic hydrocarbons (PAHs).
**(3)** *Fertilizer* has the meaning set forth in sec. 94.64(1)(e), Wis. Stats.
**(4)** *Lawn fertilizer* means any fertilizer, whether distributed by property owner, renter or commercial entity, distributed for nonagricultural use, such as for lawns, golf courses, parks and cemeteries. *Lawn fertilizer* does not include fertilizer products intended primarily for garden and indoor plant application.
**(5)** *Polycyclic aromatic hydrocarbons (PAHs)* are a group of organic chemicals that are present in coal tar and are an environmental concern because they are toxic to aquatic life.
**(6)** *Sealcoat* is a black liquid that is sprayed or painted on asphalt pavement in an effort to protect and beautify the asphalt. Most sealcoat products are coal tar or asphalt based.
[**History:** (2) and (3) renum., respectively, as (3) and (4) and a new (2), (5) and (6) cr., OA 34, 2006-07, pub. 04/19/07, eff. 07/01/07.]

**80.05 REGULATION OF THE USE AND APPLICATION OF LAWN FERTILIZER. (1)** Effective January 1, 2005, no person shall apply any lawn fertilizer within Dane County that is labeled as containing more than 0% phosphorus or other compound containing phosphorus, such as phosphate, except as provided in section 80.06.
**(2)** No lawn fertilizer shall be applied when the ground is frozen.
**(3)** No person shall apply fertilizer to any impervious surface including parking lots, roadways, and sidewalks. If such application occurs, the fertilizer must be immediately contained and either legally applied to turf or placed in an appropriate container.

**80.06 EXEMPTIONS.** The prohibition against the use of fertilizer under section 80.05 shall not apply to:
**(1)** Newly established turf or lawn areas during their first growing season.

**(2)** Turf or lawn areas that soil tests, performed within the past three years by a state-certified soil testing laboratory, confirm are below phosphorus levels established by the University of Wisconsin Extension Service. The lawn fertilizer application shall not contain an amount of phosphorus exceeding the amount and rate of application recommended in the soil test evaluation.
**(3)** Agricultural uses, vegetable and flower gardens, or application to trees or shrubs.
**(4)** Yard waste compost, biosolids or other similar materials that are primarily organic in nature and are applied to improve the physical condition of the soil.

**80.07 SALE OF FERTILIZER CONTAINING PHOSPHORUS. (1)** Effective January 1, 2005, no person shall sell or offer for sale any lawn fertilizer within Dane County that is labeled as containing more than 0% phosphorus, or other compound containing phosphorus, such as phosphate, except such fertilizer may be sold for use as provided in section 80.06.
**(2)** Effective January 1, 2005, no person shall display lawn fertilizer containing phosphorus. Signs may be posted advising customers that lawn fertilizer containing phosphorus is available upon request for uses permitted by s. 80.06.
**(3)** Effective May 1, 2004, a sign containing the regulations set forth in this ordinance and the effects of phosphorus on Dane County's waters must be prominently displayed where lawn fertilizers are sold.

**80.08 REGULATION OF THE APPLICATION AND SALE OF SEALCOAT PRODUCTS CONTAINING COAL TAR. (1)** No person shall apply any sealcoat product within Dane County that is labeled as containing coal tar.
**(2)** No person shall sell, offer to sell, or display for sale any sealcoat product within Dane County that is labeled as containing coal tar.
**(3)** Any person who sells pavement sealcoat products shall prominently display, in the area where such pavement sealcoat products are sold, a notice that contains the following language: "The application of coal tar sealcoat products on driveways, parking lots and all other paved surfaces in Dane County is prohibited by section 80.08 of the Dane County Code of Ordinances. Coal tar is a significant source of polycyclic aromatic hydrocarbons (PAHs), a group of organic chemicals that can be carried by stormwater and other runoff into Dane County's lakes and streams. PAHs are an environmental concern because they are toxic to aquatic life."
[**History:** 80.08 renum. as 80.10 and a new 80.08 cr., OA 34, 2006-07, pub. 04/19/07, eff. 07/01/07; (3) will be repealed eff. 04/01/09 unless re-enacted by the Co. Bd., OA 4, 2007-08, pub. 06/01/07.]

**80.09 EXEMPTIONS. (1)** The sale of a sealcoat product containing coal tar to a person who intends to apply the product on a surface that is not located within Dane County is permitted under the following conditions:
**(a)** The seller requires the purchaser to complete and sign a form, to be provided by the Land and Water Resources Department, that includes the purchaser's name, address, phone number, date of purchase, quantity purchased and a statement that the coal tar sealcoat product will not be applied on a surface that is located within Dane County.
**(b)** The seller retains the completed form for a period of not less than three (3) years from the date of sale and allows the inspection and copying of the form by Dane County staff upon request.
**(2)** The Director of the Land and Water Resources Department may exempt a person from the requirements of section 80.08 if the person is conducting *bona fide* research concerning the effects of a coal tar sealant product on the environment and the use of the coal tar product is required for said research.
[**History:** 80.09 renum. as 80.11 and a new 80.09 cr., OA 34, 2006-07, pub. 04/19/07, eff. 07/01/07.]

**80.10 ENFORCEMENT. (1)** Violations of this ordinance will be enforced by the Environmental Health Section of the Public Health Division of the Department of Human Services, or any successor organization.
**(2)** Any violation of this ordinance may be enforced by injunctional order at the suit of the county.
[**History:** 80.10 renum. as 80.12 and 80.08 renum. as 80.10 and, as renum., am., OA 34, 2006-07, pub. 04/19/07, eff. 07/01/07; am., OA 1, 2011-12, pub. 08/01/11.]

**80.11 PENALTY. (1)** Any person who violates section 80.05 in the application of fertilizer at his or her residence shall be subject to a forfeiture of $25 per violation.
**(2)** Any person who violates section 80.08(1) by applying a coal tar sealant product at his or

her residence shall be subject to a forfeiture of $25 per violation.

**(3)** Any commercial fertilizer applicator, residential or commercial developer, industrial or commercial owner, or other person who violates section 80.05, and any person who violates section 80.07, shall be subject to a forfeiture of $50 for the first violation within a twelve month period, $150 for the second violation within a twelve month period, and $300 for the third and each subsequent violation within a twelve month period.

**(4)** Any commercial sealcoat product applicator, residential or commercial developer, industrial or commercial owner, or any other person, other than a person identified under sub. (2) above, who violates section 80.08, shall be subject to a forfeiture of $500 for the first violation within a twelve month period, $1000 for the second violation within a twelve month period, and $2000 for the third and each subsequent violation within a twelve month period.

**(5)** Any person who applies, sells, offers to sell or displays for sale any sealcoat product within Dane County that is labeled as containing coal tar is presumed to have applied, sold, offered to sell or displayed the product in violation of this section.

[**History:** 80.09 renum. as 80.11 and, as renum., am., OA 34, 2006-07, pub. 04/19/07, eff. 07/01/07; (4) am., OA 1, 2011-12, pub. 08/01/11.]

**80.12 SEVERABILITY CLAUSE.** If any section, provision or portion of this ordinance is ruled invalid by a court, the remainder of the ordinance shall not for that reason be rendered ineffective or invalid.

[**History:** 80.10 renum. as 80.12, OA 34, 2006-07, pub. 04/19/07, eff. 07/01/07.]

*[80.13 – 80.99 reserved.]*

[**History:** Ch. 80 (sec. 80.01 through 80.10) cr., Sub. 1 to OA 33, 2003-04, pub. 04/30/04; Chapter Title am., OA 34, 2006-07, pub. 04/19/07, eff. 07/01/07.]

END OF CHAPTER

ATTACHMENT #8

TO: Steve Auth, Assistant Director Public Works, Winnetka

FROM: Rosann Park-Jones

CC: Chuck Dowding, members of the EFC

DATE: May 3, 2014

RE: **RESEARCH ON COAL TAR BANS—MONTGOMERY COUNTY, MD**

This memo summarizes my research of Montgomery County, Maryland's ban on coal tar compounds.

1) General community history relative to coal tar.

I spoke with Stan Edwards of Montgomery County, Maryland's Department of Environmental Protection, who is knowledgeable about Montgomery County's ban on coal tar compounds. Montgomery County enacted their ban in **2012 and it went into effect December 18, 2012.** This county has a population of 1,000,000 people over 495 square miles and is situated adjacent to the District of Columbia. The District of Columbia passed a coal tar ban in **2008** that went into effect on **July 1, 2009**.

Montgomery County based their ban on the neighboring District of Columbia's ban. The District's ban is part of their Comprehensive Stormwater Management Enhancement Amendment Act of 2008; violators are subject to a daily fine of up to **$2,500**. The Government of the District of Columbia issued the ban to "protect human health and our environment." According to Mr. Edwards, the District set the tone for the ban, spent a lot of time with outreach to the contractors, and they have a much larger budget for enforcement. After contractors learned about the District's ban, it made it easier for them to abide by Montgomery County's ban.

2) Does the community have an ordinance relative to coal tar?

Yes, Montgomery County, MD has an ordinance.

3) Was the ordinance enacted?

Yes, in 2012.

4) How many hearings were held? Was there an industry representative present?

I am not aware of the details of the hearings.

5) Have any tickets/fines been levied? Whom to? Contractors? Homeowners?

According to Mr. Edwards, there have been only a handful of cases that have come up since the ban was enacted, and a few phone calls received on their hotline. Montgomery County's website suggests that if citizens believe that a company or property has paved with a coal tar product after December 18, 2012, to please report any violations to **Montgomery County 311**.

No enforcement action or fines have been levied yet, according to Mr. Edwards. He indicated that his department has to cover air, water, and land violations as well as the coal tar ban, and they don't have the manpower to enforce the ban.

Mr. Edwards mentioned the field test of pavement using a vial of paint thinner and whether it turns a certain color. He said this test isn't reliable. The Montgomery Co. DEP relies on **EPA Test Method 8270** in order to test for the presence of coal tar compounds. The lab they use charges $200 for this test and it produces definitive results.

**Homeowners and contractors can be subject to potential fines of up to $1,000 for using coal tar compounds.**

6) What plans are there for public education about alternatives?

Posters are available on the County's website in English and Spanish. ***See attached poster***. The County's website has the following links:

- Montgomery County's Coal Tar Ban, What Products are Included
- Why is Coal Tar Banned?
- Alternatives to Coal Tar (residents can email additional alternative products not included on the resource listing)

7) Are program materials or educational materials employed? Are they available?

Mr. Edwards sent me examples of letters that were mailed to paving contractors, property managers/companies, and community representatives, informing them of the county's ban on any sealant that contains coal tar, refined coal tar, coal tar pitch, or RT-12. ***Examples of these letters are attached.*** He said they sent letters to approximately 135 contractors, 80 property management companies, and 750 community representatives.

When the ban took effect, the County published information on their Facebook page and Tweeted about it, and information is included on their website at http://www.montgomerycounty.gov/DEP/water/coal-tar-ban.html.

8) How is the program evaluated for effectiveness?

Mr. Edwards said that before the ban was enacted, he wanted to make sure that contractors would not have to invest in additional equipment; he did not want to put them out of business and was concerned that the ban would require too many changes. After he interviewed many contractors, he learned that the same equipment could be used for applying the asphalt-based materials rather than the coal tar compounds. He felt that the ban would only be effective if contractors did not have to bear too much of a financial burden.

Montgomery County DEP can test pavement for coal tar compounds, if needed.

9) Who is the most knowledgeable contact on this topic? Staff? May we contact?

Mr. Stan Edwards (Montgomery Co. MD DEP) was very helpful. His title is Chief, Division of Environmental Policy and Compliance and his phone number is (240) 777-7748. His address is Montgomery County Department of Environmental Protection, 255 Rockville Pike, Suite 120,

Rockville, Maryland 20850. Mr. Edwards gave me two additional contacts at the District of Columbia:

(1) Kate Judson (kate.judson@dc.gov)
(2) Brian VanWye (brian.vanwye@dc.gov)

10) Is there follow up action anticipated?

I will contact the D.C. representatives and find out more about their ban.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Isiah Leggett
*County Executive*

Robert G. Hoyt
*Director*

Dear Community Representative,

As the representative of a community in Montgomery County, Maryland, I am requesting your assistance in advising your residents of the County's recently adopted ban on coal tar-based driveway or parking lot sealants. This ban, effective December 18, 2012, prohibits the sale or use of any sealant containing *coal tar, refined coal tar*, *coal tar pitch*, or *RT-12*. Use of a coal-tar based sealant can subject the applicator and the property owner to a fine of up to $1,000. Sealants derived from asphalt or other materials without coal tar may still be sold and used in the County.

Coal tar, a byproduct of coal processing, contains high levels of chemicals called polycyclic aromatic hydrocarbons (PAHs). Some PAHs are known human carcinogens, and studies have shown when coal tar-based sealants are applied on parking lots and driveways, PAHs can be released into nearby surface waters, where they can accumulate to levels in sediments potentially harmful to aquatic wildlife. In addition, the presence of PAHs in sediments can potentially increase costs to the County government, businesses, and homeowner's associations charged with maintaining stormwater management facilities.

The law that banned coal tar-based sealants also directs the Department of Environmental Protection to publish a list of alternative products that can still be sold and used in the County. We have solicited information from contractors and suppliers of pavement sealants as a resource to residents and businesses seeking a pavement services contractor. This information, as well as general information on the County's ban, can be found at www.montgomerycountymd.gov/DEP/coaltarban.

Thank you for your assistance in sharing information about this law. The attached flyer about the ban can be used in electronic communications, or be posted or handed out at community meetings. If you have any questions about the coal tar ban, please contact Stan Edwards, Chief, Division of Environmental Policy & Compliance at 240-777-7748 or stan.edwards@montgomerycountymd.gov.

Sincerely,

Robert G. Hoyt
Director

**Office of the Director**

255 Rockville Pike, Suite 120 • Rockville, Maryland 20850-2589 • 240/777-7770
www.montgomerycountymd.gov

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Isiah Leggett
*County Executive*

Robert G. Hoyt
*Director*

Dear Paving Professional,

As a company that may provide asphalt paving or sealing services in Montgomery County, Maryland, I am contacting you to ensure you are aware of the County's recently adopted ban on coal tar-based driveway or parking lot sealants. This ban, effective December 18, 2012, prohibits the sale or use of any sealant containing *coal tar, refined coal tar*, *coal tar pitch*, or *RT-12*. Use of a coal-tar based sealant can subject the applicator and the property owner to a fine of up to $1,000. Sealants derived from asphalt or other materials without coal tar may still be sold and used in the County.

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The law that banned coal tar-based sealants also directs the Department of Environmental Protection to publish a list of alternative products that can still be sold and used in the County. This information, which will be published on the County's website, will serve as a resource to residents and businesses seeking a pavement services contractor. If you would like the non-coal tar based products you utilize, as well as contact information for your company, listed on this website, please send an e-mail to AskDEP@montgomerycountymd.gov. Please provide the name of each product, and attach a copy of or provide a link to the Material Safety Data Sheet or other documentation describing the characteristics of the product.

Thank you for your assistance in complying with this law. For more information on the County's ban on coal tar pavement sealants, visit www.montgomerycountymd.gov/DEP/coaltarban, or contact Stan Edwards, Chief, Division of Environmental Policy & Compliance at 240-777-7748 or stan.edwards@montgomerycountymd.gov.

Sincerely,

Robert G. Hoyt
Director

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Isiah Leggett
*County Executive*

Robert G. Hoyt
*Director*

Dear Property Manager,

As the manager of property in Montgomery County, Maryland, that may utilize the services of a pavement sealing contractor, I am contacting you to ensure you are aware of the County's recently adopted ban on coal tar-based driveway or parking lot sealants. This ban, effective December 18, 2012, prohibits the sale or use of any sealant containing *coal tar, refined coal tar*, *coal tar pitch*, or *RT-12*. Use of a coal-tar based sealant can subject the applicator and the property owner to a fine of up to $1,000. Sealants derived from asphalt or other materials without coal tar may still be sold and used in the County.

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Thank you for your assistance in complying with this law. If you have any questions about the coal tar ban, please contact Stan Edwards, Chief, Division of Environmental Policy & Compliance at 240-777-7748 or stan.edwards@montgomerycountymd.gov.

Sincerely,

Robert G. Hoyt
Director

# NOTICE

## Coal tar pavement sealants are now prohibited in Montgomery County.

## Potential fines of up to $1,000 for using coal tar.

## Before using a paving sealant, check to make sure it does not contain: coal tar, coal tar pitch or RT-12.

### Why:

Coal tar, a byproduct of coal processing, contains high levels of chemicals called polycyclic aromatic hydrocarbons (PAHs).

FOR HUMAN HEALTH: Some PAHs are known carcinogens.

TO PROTECT WILDLIFE: Studies have shown that when coal tar-based sealants are applied on parking lots and driveways, PAHs can be released into nearby surface water. The chemicals can then accumulate in sediments to levels potentially harmful to aquatic wildlife.

TO SAVE MONEY: The presence of PAHs in sediments can potentially increase costs to the County government, businesses, and homeowner's associations charged with maintaining stormwater management facilities.

### Alternatives:

Approved alternatives for coal tar sealants include:

- Asphalt-based Sealant
- Latex Sealant

Any material containing coal tar, refined coal tar, coal tar pitch, or RT-12 is prohibited.

For those hiring a contractor to perform the job, make sure you specify a product without coal tar. Ask to see the ingredient list of the product they are using. For do-it-yourselfers, local home improvement stores carry asphalt-based or latex sealants.

**Use of a coal tar-based sealant can subject the applicator and the property owner to a fine of up to $1,000, effective December 18, 2012.**

**For a list of more alternative sealants and information on the County's ban on coal tar pavement sealants, visit www.montgomerycountymd.gov/coaltarban.**

Montgomery County
Department of Environmental Protection
255 Rockville Pike, Suite 120
Rockville, MD 20850

Photo by Justin McInnis/ U.S. Geological Survey

ATTACHMENT #9

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# Concentrations of polycyclic aromatic hydrocarbons (PAHs) and azaarenes in runoff from coal-tar- and asphalt-sealcoated pavement

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ABSTRACT

Coal-tar-based sealcoat, used extensively on parking lots and driveways in North America, is a potent source of PAHs. We investigated how concentrations and assemblages of PAHs and azaarenes in runoff from pavement newly sealed with coal-tar-based (CT) or asphalt-based (AS) sealcoat changed over time. Samples of simulated runoff were collected from pavement 5 h to 111 d following application of AS or CT sealcoat. Concentrations of the sum of 16 PAHs (median concentrations of 328 and 35 μg/L for CT and AS runoff, respectively) in runoff varied relatively little, but rapid decreases in concentrations of azaarenes and low molecular weight PAHs were offset by increases in high molecular weight PAHs. The results demonstrate that runoff from CT-sealcoated pavement, in particular, continues to contain elevated concentrations of PAHs long after a 24-h curing time, with implications for the fate, transport, and ecotoxicological effects of contaminants in runoff from CT-sealcoated pavement.

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## 1. Introduction

Coal-tar-based (CT) pavement sealcoat, a potent source of polycyclic aromatic hydrocarbons (PAHs) (as reviewed in Mahler et al., 2012), is used extensively on asphalt pavement in many parts of the US and Canada. Fish kills have been reported when rainfall has resulted in runoff within hours after CT sealcoat application (RiverFox911, 2010; Hamilton County, 2011), and industry best-management practices recommend that CT sealcoat not be applied if rain is forecast within 24 hours (h), to allow the product time to cure (Construction Pros, 2013). Several questions thus arise: Should rainfall occur unexpectedly within 24 h of sealcoat application, what chemicals are present in runoff, and at what concentrations? If runoff occurs more than 24 h after application, how do chemical concentrations change during the following days, weeks, or months? And finally, how do chemical concentrations in runoff from CT-sealed pavement compare to those from pavement treated with an asphalt-based (AS) sealcoat product?

Sealcoat is a black, viscous liquid that is applied to the asphalt pavement of many parking lots, residential driveways, and even some playgrounds, although it rarely is used on roads. Sealcoat is marketed as protecting and beautifying the underlying asphalt. The two principal sealcoat formulations are asphalt-based and coal-tar-based. AS sealcoat primarily is used west of the Continental Divide, and typically contains about 50 mg/kg PAHs, although the concentration varies widely (4–8000 mg/kg for 11 products tested (City of Austin, 2005)). CT sealcoat primarily is used east of the Continental Divide and in parts of Canada (Diamond Environmental Group, 2011). CT sealcoat typically is 20–35% coal tar or coal-tar pitch, which are known human carcinogens; CT sealcoat products typically contain about 70,000 mg/kg PAH (Mahler et al., 2005), although, as with AS sealcoat, the concentration varies widely by product and manufacturer (6000 to 230,000 mg/kg for 14 products tested (City of Austin, 2005)).

Three previous studies have noted high concentrations of PAHs in runoff from pavement with CT sealcoat and changes with time following sealcoat application. The U.S. Geological Survey (USGS) measured concentrations of 12 aqueous-phase (filtered at 0.5 μm) and particle-associated PAHs in runoff from two CT-sealed pavement test plots and one AS-sealed pavement test plot beginning 15 days (d) after application (Mahler et al., 2004). The sum of concentrations of the PAHs measured, converted to whole-water (unfiltered) concentrations, in runoff from the CT-sealed pavement decreased from 48–64 (time [$t$] = 15 d) to 5–10 μg/L ($t$ = 52 d); concentrations in runoff from the AS-sealed pavement decreased from 5.1 to 1.5 μg/L during the same period. More recently, the U.S. Environmental Protection Agency (EPA) measured PAHs in unfiltered runoff from CT-sealed pavement in a bench-scale study and in a field study (sealed pavement test plot with no

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vehicle traffic) (Rowe and O'Connor, 2011). In the bench-scale study, the sum of 17 PAHs measured decreased from more than 100 μg/L at $t = 24$ h (the manufacturer-recommended curing time) to about 10 μg/L ($t = 30$ d). The sum of the concentrations of the 17 PAHs in runoff from the test plot decreased from about 250 μg/L ($t = 24$ h) to about 80 μg/L ($t = 30$ d), but 160 d after application was still about 100 μg/L. One potentially important factor in both studies is that the test plots (or bench study) did not have vehicle traffic; yields of PAHs in runoff from in-use parking lots were reported to be significantly greater than from test plots because of abrasion of the dried sealcoat by vehicle tires (Mahler et al., 2005). In contrast, Watts et al. (2010) investigated PAH concentrations in runoff from two in-use parking lots, each commercially sealed with a different CT sealcoat product. The sum of concentrations of 16 PAHs in unfiltered runoff decreased from 5890 and 642 μg/L ($t = 26$ h) to 24 and 88 μg/L ($t = 18$ d), respectively. These studies added to our understanding of concentrations in PAHs in runoff from sealed pavement, but each had limitations. Mahler et al. (2004) reported concentrations of 54 PAHs and alkylated homologues, but samples were not collected until 15 d following application and the pavement had no vehicle traffic. Rowe and O'Connor (2011) collected samples beginning 24 h after application, but concentrations of individual PAHs were presented only in graphical form on a logarithmic scale, and the pavement had no vehicle traffic. Watts et al. (2010) collected samples beginning 26 h after application to pavement with vehicle traffic, but concentrations of individual PAHs were presented only in graphical form on a logarithmic scale, and AS-sealed pavement was not sampled.

An important question thus remains unanswered: How do PAH assemblages change in the hours to days following application of CT- and AS-sealant in a realistic setting (i.e., in-use pavement)? This is a key question from an environmental standpoint, as the low molecular weight (LMW) PAHs have different chemical characteristics and ecotoxicological properties than do the high molecular weight (HMW) PAHs (Eisler, 1987). Further, published studies have focused on PAHs, but coal tar contains many other chemicals, including azaarenes, a sub-class of heterocyclic aromatic compounds in which a nitrogen atom replaces a carbon atom in one of the aromatic rings of a PAH. Anthropogenic sources of azaarenes in the environment include coal-tar and oil-shale processing operations, wood-preserving facilities, and chemical manufacturing plants (de Voogt and Laane, 2009). Azaarenes include such compounds as quinolone, acridine, and carbazole; coal tar typically is about 1.5% (15,000 mg/kg) carbazole (Obloj-Muzaj et al., 1996). Several heterocyclic aromatic compounds, including azaarenes, have a large range of ecotoxicological effects, including acute toxicity, developmental and reproductive toxicity, cytotoxicity, photo-induced toxicity, mutagenicity, and carcinogenicity (Peddinghaus et al., 2012). The effects of azaarenes on organisms, however, are much less well studied than are those of PAHs (de Voogt and Laane, 2009).

Here we report concentrations of selected PAHs and three related heterocyclic compounds in the solid phase (scrapings of dried sealcoat) and PAHs and azaarenes in whole-water (unfiltered) runoff from parking lot pavement with CT sealcoat and with AS sealcoat. Sample collection began 5 h following sealcoat application and continued at increasing intervals to 36 d (AS sealcoat) or 111 d (CT sealcoat) following sealcoat application and subsequent vehicular use of the treated pavement.

## 2. Methods

### 2.1. Study site and sample collection

Samples were collected from two pavement test plots in areas of active use for parking and driving on the Pickle Research Campus, University of Texas at Austin (Supplementary material Fig. S1). The test plots are located about 630 m apart, and are separated by several intervening buildings and parking lots, precluding the possibility of aerial cross-contamination. A commercial applicator applied CT sealcoat (Tarconite, Neyra Industries, Inc.) to the first test plot at 11 am, August 23, 2011, and AS sealcoat (Paveshield, Neyra Industries, Inc.) to the second test plot at 11 am, September 20, 2011 (time of application, t = 0) (Material Safety Data Sheets provided in Supplementary material). Following a 24-h curing period the test plots were opened to normal traffic and parking activities.

Prior to sealcoat application, several 5-cm-diameter aluminum disks were placed on each test plot. One disk was removed from each test plot at 5 h and at 1, 3, 7, and 36 d following sealcoat application. A solid-phase sample was obtained by scraping dried sealcoat from the disk with a cleaned metal paint scraper.

Water used to simulate rain-water runoff was prepared at the USGS Columbia Environmental Research Center (CERC), Columbia, MO. The water was prepared as a mixture of CERC well water and deionized water and had the following water-quality characteristics: hardness of about 100 mg/L as $CaCO_3$, alkalinity of about 90 mg/L as $CaCO_3$, a pH of about 8.3, and the following concentrations of selected major ions and dissolved organic carbon (mg/L): $Ca^{2+}$ 28, $Mg^{2+}$ 10, $K^+$ 1.0, $Na^+$ 10, $Cl^-$ 12, $SO_4^{2-}$ 19, and dissolved organic carbon 0.5 (Chris Ingersoll, written comm., USGS, 2011).

Runoff samples were collected beginning 5 h after application and sample collection continued at increasing intervals following the approach described by Mahler et al. (2005). All samples except the second were collected during the afternoon; the second sample was collected at 11:00 pm ($t = 12$ h). One sample of runoff from unsealed asphalt pavement was collected (unsealed control). For each sample, a 10 $m^2$ section of test plot was sprinkled with 25 L of the prepared water to simulate a light rain [25 mm (about 0.1 in)]. Runoff was collected with a peristaltic pump at the down-slope end of the pavement where the runoff pooled behind spill berms. Recovered water was split, while churning, into several 1-L baked amber glass bottles for analysis of PAHs and azaarenes and of suspended sediment concentration (SSC), and for archival purposes (frozen). Each subsequent runoff sample was collected from a new section of the test plot. Between August 1 and November 5, 2011, measurable rainfall occurred only on Oct 9 and 10 (112 and 38 mm, respectively) (Supplementary material Fig. S2), so the simulated runoff samples collected during at least the first 7 d following application represent runoff from the first "rainfall" to occur at an increasing length of time following sealant application.

### 2.2. Analytical

PAHs and heterocyclic compounds in solid-phase samples and in whole (unfiltered) water were analyzed at the USGS National Water Quality Laboratory (NWQL) in Lakewood, CO. Solid-phase samples for measurement of the 16 USEPA Priority Pollutant PAHs (naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benz[*a*]anthracene, chrysene, benzo[*a*]pyrene, benzo[*b*]fluoranthene, benzo[*k*]fluoranthene, benzo[*ghi*]perylene, indeno[1,2,3-*cd*]pyrene and dibenz[*a,h*]anthracene), and three related heterocyclic compounds (9,10-anthraquinone, carbazole, and dibenzothiophene) were prepared and analyzed by gas chromatography/mass spectrometry using electron-impact ionization (GC/EIMS) according to Zaugg et al. (2006). Samples were analyzed in either the full-scan mode or selected ion monitoring mode.

The 16 USEPA Priority Pollutant PAHs and 7 azaarenes (quinoline, isoquinoline, acridine, phenanthridine, carbazole, benzo[*c*]cinnoline, and 2,2′-biquinoline) were measured in whole water. The 1-L unfiltered water samples were extracted and analyzed using procedures comparable to those described in Zaugg et al. (2007). In brief, upon arrival at the laboratory, the samples were treated with 60 g NaCl and then stored at 4 °C for as much as 14 d until extraction. Samples were fortified with surrogate compounds 2-fluorobiphenyl and *p*-terphenyl-$d_{14}$, and transferred to continuous liquid–liquid extractors (CLLE) with one rinse of the sample bottle with distilled water and two rinses with dichloromethane (DCM). Samples were extracted with DCM at ambient pH for 3 h, and then at pH 2 (by addition of 3 mL of a 25% $H_2SO_4$ solution) for an additional 3 h. The DCM extracts were concentrated by distillation within the CLLE. The extracts were further reduced to a final volume of 400 μL using $N_2$, followed by the addition of 20 μL of a 100-ng/μL procedural internal standard solution that includes 5 perdeuterated PAHs. The extracts were stored at ≤−10 °C until analysis by GC/EIMS.

Because of anticipated high PAH concentrations in CT-runoff samples, only 1:10 and 1:100 dilutions of those extracts were analyzed. Reporting levels were raised accordingly. Undiluted extracts were analyzed for AS-runoff samples, with 1:10 dilution of extracts used for those analytes that exceeded the calibration curve in undiluted extracts. Reporting levels were based on method detection limits (MDLs) established using spiked reagent water or from instrument calibration quantitation limits for compounds without an MDL. Total PAH is reported as the sum of the 16 U.S. Environmental Protection Agency Priority Pollutant PAHs ($\Sigma PAH_{16}$); non-detections were conservatively treated as zeroes for summation purposes. Pearson's correlation coefficient ($r$) and the coefficient of determination ($r^2$), where cited, are significant at $p < 0.05$.

Concentrations of suspended sediment were determined at the USGS Sediment Laboratory at the Louisiana Water Science Center. Samples were analyzed by filtration as described by Guy (1969).

### 2.3. Quality control

Quality assurance was provided by analyzing a field equipment blank (whole-water runoff), laboratory blanks, and spiked reagent samples, and by monitoring

recovery of surrogate compounds. Analytes in the field equipment blank either were not detected or were measured at estimated concentrations from 2 (fluorene) to 15 (carbazole) percent of the lowest environmental concentration measured for that analyte (Supplementary material Table S1). Analytes in laboratory blanks for the solid phase either were not detected or were measured at concentrations from 0.001 (benzo[*b*]fluoranthene) to 0.006 (acenaphthene) percent of the lowest environmental concentration measured for that analyte (data not shown). Analytes in laboratory blanks for whole water either were not detected or were measured at concentrations ranging from 0.01 (fluoranthene) to 2.6 (benzo[*ghi*]perylene) percent of the lowest environmental concentration measured for that analyte (data not shown). All spike recoveries were within NWQL established limits. A typical surrogate recovery range of 52–101% was observed for 2-fluorobiphenyl, but recoveries of *p*-terphenyl-$d_{14}$ (24–60%) were lower than typical in both CT- and AS-runoff samples, which might indicate that there was a matrix effect on the recovery of some of the HMW PAHs. Concentrations in runoff samples were not corrected for recovery of surrogates. Relative standard deviations were determined on the basis of laboratory set spike replicates ($n = 5$ for whole water and $n = 94$ for solid phase).

## 3. Results

### 3.1. Solid phase (dried sealcoat)

Concentrations of $\Sigma PAH_{16}$ in dried CT sealcoat decreased from 93,300 mg/kg on the day of application to 46,300 mg/kg at $t = 36$ d, a decrease of 50% (Table 1; Supplemental material Table S2). During this period, there generally was a greater loss to the environment of LMW PAHs (2- and 3-ring) (median loss among compounds 84%) than of HMW PAHs (4-, 5-, and 6-ring) (median loss 36%). The PAH assemblage evolved from one dominated by phenanthrene to one dominated by fluoranthene (Fig. 1); fractional concentrations of most LMW PAHs decreased and those of most HMW PAHs increased, as observed by Van Metre et al. (2012) and attributed primarily to loss by volatilization. Losses of the heterocyclic compounds carbazole and dibenzothiophene (58 and 70%, respectively) were less than those of fluorene (88%), the PAH most similar to them in structure. Concentrations of 9,10-anthraquinone, an oxy-PAH formed by photo-induced oxidation of anthracene (Mallakin et al., 1999), increased by about 400% during the 36 d following sealcoat application.

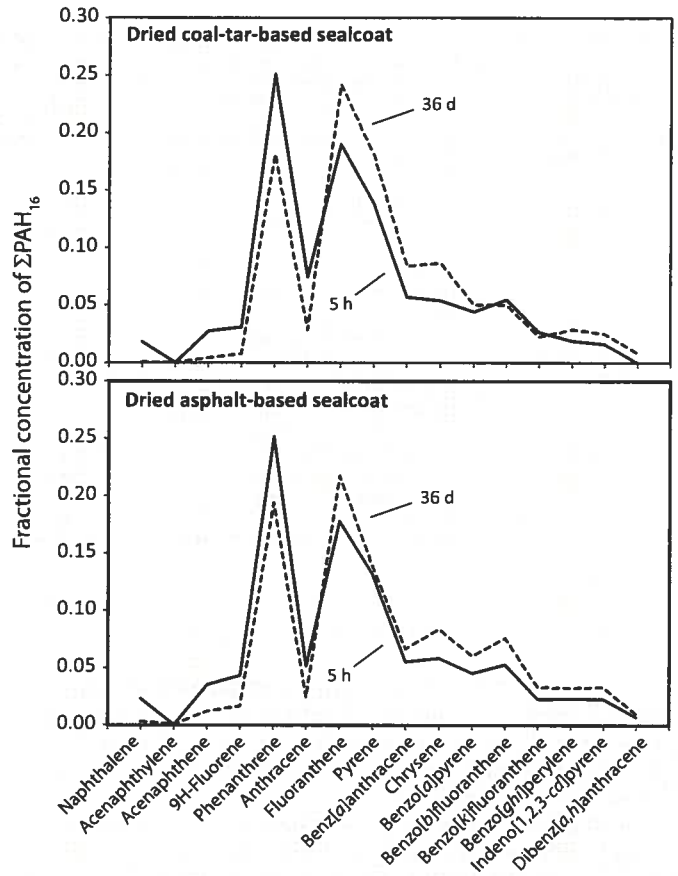


**Fig. 1.** Assemblage of the 16 U.S. Environmental Protection Agency Priority Pollutant PAHs in scrapings of dried sealcoat collected 5 h and 36 d following sealcoat application to asphalt pavement test plots. Pearson's correlation coefficient (*r*) of 0.993 for the coal-tar-based sealcoat and asphalt-based sealcoat assemblages 5 h after sealcoat application.

**Table 1**
PAH loss over the first 36 days following sealcoat application. A negative value indicates a loss, a positive value indicates a gain. Concentrations for individual PAHs provided in Table S1. [NC, not computed because at least one value was a non-detection; $\Sigma PAH_{16}$, sum of the 16 USEPA Priority Pollutant PAHs; NM, not measured].

| Compound | Change over 36 d (%) | | | |
|---|---|---|---|---|
| | Scrapings | | Runoff | |
| | Coal-tar-sealcoated pavement | Asphalt-seacoated pavement | Coal-tar-sealcoated pavement | Asphalt-sealcoated pavement |
| **Polycyclic aromatic hydrocarbon** | | | | |
| Naphthalene | −99% | −92% | −98% | −80% |
| Acenaphthylene | −11% | 26% | NC | NC |
| Acenaphthene | −92% | −81% | −96% | −94% |
| Fluorene | −88% | −79% | −93% | −27% |
| Phenanthrene | −64% | −58% | −71% | −89% |
| Anthracene | −81% | −75% | −89% | −70% |
| Fluoranthene | −37% | −33% | 49% | 341% |
| Pyrene | −35% | −42% | 51% | 286% |
| Benz[*a*]anthracene | −27% | −34% | 50% | 514% |
| Chrysene | −20% | −21% | 203% | 763% |
| Benzo[*b*]fluoranthene | −55% | −21% | 242% | 853% |
| Benzo[*k*]fluoranthene | −58% | −20% | 201% | 1154% |
| Benzo[*a*]pyrene | −44% | −27% | 195% | 897% |
| Indeno(1,2,3-*cd*)pyrene | −22% | −20% | 272% | 1734% |
| Dibenz[*a,h*]anthracene | NC | −27% | NC | NC |
| Benzo[*ghi*]perylene | −24% | −23% | 288% | 2400% |
| $\Sigma PAH_{16}$ | −50% | −45% | 15% | 63% |
| **Heterocyclic compound** | | | | |
| Quinoline | NM | NM | −92% | NC |
| Isoquinoline | NM | NM | −95% | NC |
| Acridine | NM | NM | −76% | −38% |
| Phenanthridine | NM | NM | −42% | −55% |
| Carbazole | −58% | −24% | −92% | −76% |
| Dibenzothiophene | −70% | −50% | NM | NM |
| 9,10-Anthraquinone | 405% | 212% | NM | NM |

Concentrations of $\Sigma PAH_{16}$ in samples of dried AS sealcoat decreased from 6300 to 3500 mg/kg over the 36 d following application, a decrease of 45% (Tables 1,2). The initial concentration ($t = 5$ h) of 6300 mg/kg was at the upper end of the range measured by the City of Austin for 11 asphalt-based products (4 mg/kg to 8000 mg/kg) (City of Austin, 2005). The PAH assemblage of the initial sample of dried AS sealcoat was very similar to that of the dried CT sealcoat (Fig. 1) (*r* of 0.993; dibenz[*a,h*]anthracene not included in the correlation as it was not detected in any sample). Over the 36 d that followed application, the dried AS sealcoat had large losses of LMW PAHs, smaller losses of HMW PAHs, and a large increase in 9,10-anthraquinone concentration, similar to changes measured for dried CT sealcoat (Table 1). The relatively high PAH concentrations in the dried AS-sealcoat and the similarity of its PAH assemblage to that of dried CT sealcoat indicates that the AS sealcoat applied might have contained some CT sealcoat. Assuming a PAH concentration in "pure" AS sealcoat of 50 mg/L, an addition of 7% CT sealcoat (containing a PAH concentration of 93,000 mg/kg) would be sufficient to explain a concentration of 6300 mg/kg in the AS sealcoat applied.

**Table 2**
Sums of the concentrations of the 16 USEPA Priority Pollutant PAHs ($\Sigma PAH_{16}$), of the low molecular weight PAHs (2- and 3-rings; $\Sigma PAH_{LMW}$), and the high molecular weight PAHs (4-, 5, and 6-rings; $\Sigma PAH_{HMW}$) in samples of simulated runoff, in micrograms per liter.

| Surface type | Sample date | Time after sealcoat application (hours) | Time after sealcoat application (days) | Suspended sediment concentration (mg/L) | $\Sigma PAH_{16}$ | $\Sigma PAH_{LMW}$ | $\Sigma PAH_{HMW}$ |
|---|---|---|---|---|---|---|---|
| Coal-tar sealcoat | 23-Aug-2011 | 5 | 0.2 | 8 | 357 | 220 | 136 |
| | 23-Aug-2011 | 12 | 0.5 | 1 | 237 | 130 | 107 |
| | 24-Aug-2011 | 26 | 1 | 5 | 343 | 233 | 110 |
| | 25-Aug-2011 | 54 | 2 | 10 | 190 | 107 | 84 |
| | 26-Aug-2011 | 75 | 3 | 13 | 202 | 92 | 109 |
| | 30-Aug-2011 | 173 | 7 | 35 | 476 | 98 | 378 |
| | 28-Sep-2011 | 866 | 36 | 48 | 409 | 55 | 354 |
| | 26-Oct-2011 | 1541 | 64 | 30 | 167 | 21 | 145 |
| | 12-Dec-2011 | 2666 | 111 | 31 | 328 | 45 | 283 |
| Asphalt sealcoat | 20-Sep-2011 | 4 | 0.2 | 9 | 38 | 30 | 8 |
| | 20-Sep-2011 | 11 | 0.5 | 5 | 21 | 16 | 5 |
| | 21-Sep-2011 | 26 | 1 | 9 | 35 | 27 | 8 |
| | 22-Sep-2011 | 50 | 2 | 14 | 43 | 34 | 9 |
| | 23-Sep-2011 | 74 | 3 | 15 | 33 | 24 | 9 |
| | 27-Sep-2011 | 170 | 7 | 37 | 27 | 17 | 10 |
| | 26-Oct-2011 | 865 | 36 | 104 | 63 | 12 | 50 |
| Unsealed asphalt | 27-Sep-2011 | n/a | n/a | 598 | 17 | 1.4 | 16 |

### 3.2. Aqueous phase (unfiltered runoff)

Runoff samples did not indicate any physical fouling. Runoff samples were clear with an amber hue (Supplementary material Fig. S3), and samples collected in the hours to days following sealcoat application contained low concentrations (≤10 mg/L) of suspended sediment (Table 2).

Fourteen of the 16 PAHs were detected in all runoff samples from the CT- and AS-sealed test plots; the exceptions were acenaphthylene and dibenz[*a*,*h*]anthracene (Supplementary material Table S1). Four of the 16 PAHs were not detected in the control sample (runoff from unsealed asphalt): three 3-ring PAHs (acenaphthene, acenaphthylene, and fluorene) and dibenz[*a*,*h*]anthracene. The median concentration of $\Sigma PAH_{16}$ in the CT-sealed runoff (328 μg/L) was about 19 times higher than the concentration in the unsealed asphalt control (17 μg/L); the median concentration in the AS-sealed runoff (35 μg/L) was about twice as high as the concentration in the control (Table 2).

Overall, concentrations of $\Sigma PAH_{16}$ in runoff samples varied within a factor of about 3, but did not systematically increase or decrease. At the end of the sampling period, concentrations of $\Sigma PAH_{16}$ were similar to those in the initial sample (CT) or greater than those in the initial sample (AS) (Fig. 2). In contrast, concentrations of individual PAHs varied substantially: concentrations of most LMW PAHs decreased by about an order of magnitude, and concentrations of most HMW PAHs increased by a factor of 2–4 (Supplementary material Table S1). Similar to the solid-phase samples, $\Sigma PAH_{16}$ in the initial runoff sample was dominated by phenanthrene for both CT-sealed (131 μg/L) and AS-sealed (13.0 μg/L) test plots, and in the final sample was dominated by fluoranthene (CT runoff 70.4 μg/L; AS runoff 14.2 μg/L) (Supplementary material Table S1). The sum of the concentrations of the LMW PAHs ($\Sigma PAH_{LMW}$) for CT runoff, which initially was greater than the sum of the HMW PAHs ($\Sigma PAH_{HMW}$), decreased to about 26% of $\Sigma PAH_{HMW}$ by $t$ = 7 d (Table 2), and the ratio of $\Sigma PAH_{LMW}$ to $\Sigma PAH_{HMW}$ remained relatively constant during $t$ = 7–111 d (Fig. 3a). $\Sigma PAH_{LMW}$ from both test-plot types generally decreased over the sampling period, with the exception of anomalously low concentrations in the second sample collected (the only nighttime sample; $t$ = 12 h), whereas $\Sigma PAH_{HMW}$ decreased slightly over the first 2 days then generally increased but was variable (Fig. 3b and c). The SSC also generally increased, ranging from less than 10 mg/L (both CT and AS) in the initial sample to 31 mg/L in the final CT sample and 104 mg/L in the final AS sample (Table 2). $\Sigma PAH_{HMW}$ was positively related to SSC for both CT runoff ($r^2$ = 0.75) and AS runoff ($r^2$ = 0.94). [SSC and $\Sigma PAH_{LMW}$ were inversely related for CT runoff ($r^2$ = 0.50) but not significantly related for AS runoff. SSC and $\Sigma PAH_{16}$ were positively related for both CT runoff ($r^2$ = 0.62) and AS runoff ($r^2$ = 0.60).] The strong relation between SSC and $\Sigma PAH_{HMW}$ likely is because much of the SSC consisted of abraded sealcoat particles.

Of the seven azaarenes measured, acridine, phenanthridine, and carbazole were detected in every runoff sample, including the unsealed runoff control (Supplementary material Table S1). Quinoline and isoquinoline were detected in all samples of CT and most samples of AS runoff but not in the control, and benzo[*c*]cinnoline and 2,2′-biquinoline were not detected in any samples. Concentrations of carbazole were consistently much higher than those of the other azaarenes; in the initial CT sample, the concentration of carbazole (750 μg/L) also exceeded that of any of the 16 PAHs by a factor of 5 or more. Concentrations of the azaarenes in runoff generally decreased following sealcoat application. For all azaarenes measured, the concentration in the sample collected at night

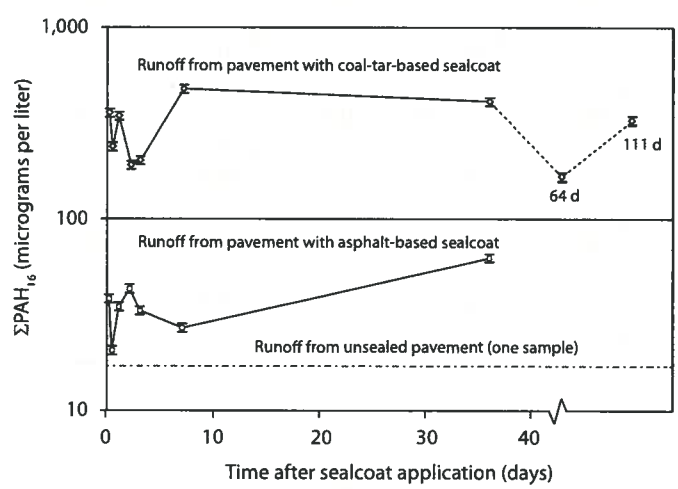


**Fig. 2.** The sum of concentrations of the 16 U.S. Environmental Protection Agency Priority Pollutant PAHs ($\Sigma PAH_{16}$) in runoff following application of sealcoat to asphalt pavement test plots. Error bars indicate relative standard deviation determined on the basis of laboratory replicates.

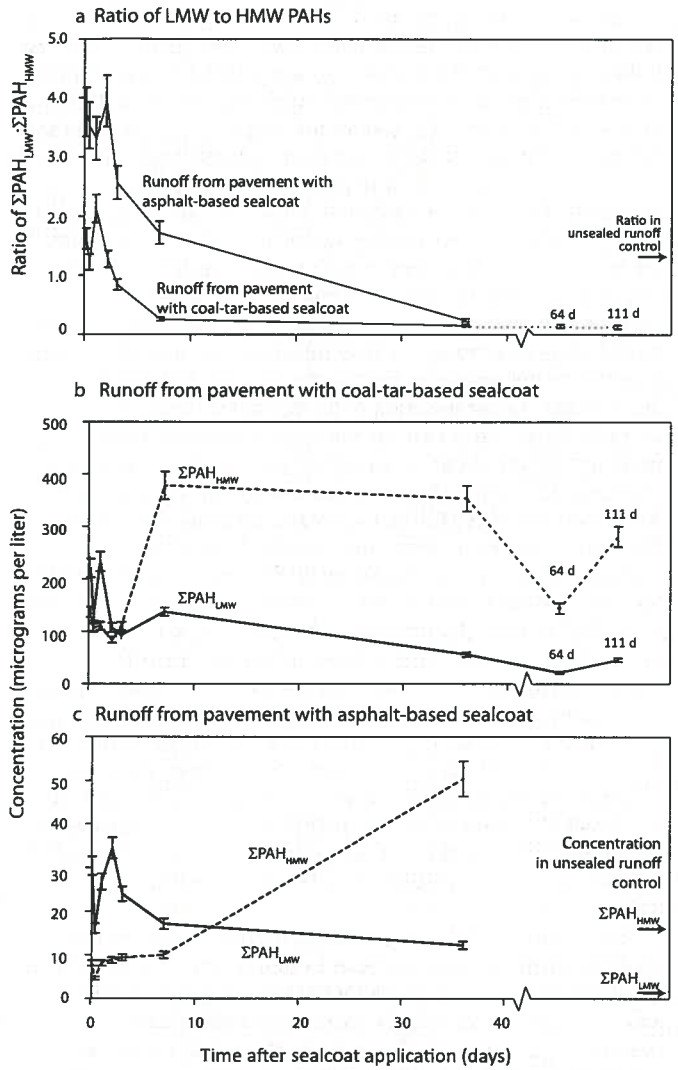


**Fig. 3.** (a) Time-series of the ratio of the sum of concentrations of the low molecular weight (2- and 3-ring) PAHs ($\Sigma PAH_{LMW}$) to that of the high molecular weight (4-, 5-, and 6-ring) PAHs ($\Sigma PAH_{HMW}$) in runoff following application of sealcoat to asphalt pavement test plots. (b) Changes in $\Sigma PAH_{LMW}$ and $\Sigma PAH_{HMW}$ in runoff following application of coal-tar-based sealcoat. (c) Changes in $\Sigma PAH_{LMW}$ and $\Sigma PAH_{HMW}$ in runoff following application of asphalt-based sealcoat. Error bars indicate relative standard deviation determined on the basis of laboratory replicates.

($t = 12$ h) was lower than in the preceding and following samples, and for several compounds (quinoline, isoquinoline, acridine, and phenanthridine in CT runoff and quinoline in AS runoff) the concentration in the sample collected 7 d after application was higher than in the preceding or following sample (Supplementary material Table S1), possibly related to the increase in SSC between 3 and 7 d following application. Even in the final sample collected, concentrations of the azaarenes in runoff, when detected, exceeded those in the control sample by a factor of 7–36 (CT runoff) or 3–10 (AS runoff) (Supplementary material Table S1).

## 4. Discussion

A primary objective of this study was to compare the chemistry of runoff from CT- and AS-sealed pavement. The chemical composition of the dried AS-sealcoat product and the runoff from the AS-sealed test plot indicates that the product might have contained some coal-tar pitch, equivalent to about 7% CT sealcoat. Some mixing might occur as an applicator switches from one type of sealcoat to another, although the applicator stated that the tank and other equipment used had been cleaned before filling the tank with AS sealcoat (Marcia Pederson, Stripe-Rite, oral communication, 2013). The mixing of some CT sealcoat with AS sealcoat also might have occurred at some point in the supply chain. Similar anomalous findings have been reported by the City of Austin: of 11 AS-sealcoat products analyzed, 2 had much higher concentrations (about 1500 and 8000 mg/kg) than the other 9, although much lower than those in most CT-sealcoat products analyzed (median concentration ~70,000) (City of Austin, 2005). The two AS-sealcoat products with high concentrations were among five obtained from commercial distributors who provide products to applicators; six retail (off-the-shelf) products all had low PAH concentrations. We conclude that it might not be uncommon for sealcoat marketed as AS sealcoat to contain a small amount of CT sealcoat, which can increase PAH concentrations in the AS sealcoat by one or more orders of magnitude. The concentrations measured here for the AS test plot likely represent a high-end concentration scenario for runoff from AS-sealed pavement, but little information on quality control involved in AS sealcoat production and distribution is available.

Concentrations of $\Sigma PAH_{16}$ concentrations in runoff from CT-sealed pavement, and, to a lesser degree, AS-sealed pavement remained high long after a 24- or even 48-h curing time had passed (Fig. 2, Table 2). This indicates that deleterious effects of runoff from CT-sealed pavement, and, to a lesser extent, AS-sealed pavement to aquatic organisms might continue for days to even months after application. For example, the LC50 (the concentration at which 50% of the population will die) for rainbow trout (*Oncorrhynchus mykiss*) exposed to phenanthrene was reported as 30 μg/L (Milleman et al., 1984); this concentration was exceeded in every sample of CT-sealcoat runoff collected during the 7 d following application. Rainbow trout exposed to water containing sand contaminated with benzo[*a*]pyrene at a concentration of 0.2 μg/L resulted in gross anomalies in 6.8% of the population (Hose et al., 1984); this concentration in CT-sealcoat runoff was exceeded by a factor of 10 in runoff collected during the first 7 d after application and by a factor of 100 in most runoff samples collected from 7 to 111 d after application; it also was exceeded by as much as a factor of 10 in one of the AS-sealcoat runoff samples. Toxicity might be exacerbated for organisms exposed to sunlight; some PAHs adsorb UV light, which alters the reactivity of the PAH and can render it more toxic, although these effects pertain primarily to aquatic species in shallow water (Meador, 2010). For example, bluegill sunfish (*Lepomis macrochirus*) exposed to anthracene at a concentration of 12.7 μg/L died within 48 h when they were in bright sunlight (Bowling et al., 1983). This concentration was exceeded in all but one of the CT runoff samples collected during the 7 d following application; it was not exceeded in any of the AS runoff samples.

The concentrations measured here are substantially higher than those reported by Mahler et al. (2004) and, to a lesser extent, by Rowe and O'Connor (2011). This difference might arise for one or more reasons. First, Mahler et al. reported only the concentration of the sum of the 12 parent PAH ($\Sigma PAH_{12}$); when $\Sigma PAH_{12}$ is computed for the data presented here, however, the concentration is only 10–30% less than the concentration of $\Sigma PAH_{16}$, insufficient to account for the much larger difference in concentrations between the two studies. (Seventeen PAHs were analyzed by Rowe and O'Connor). Second, although the same brand of CT and AS sealcoat was applied for both the Mahler et al. (2004) study and the study presented here, the concentration of $\Sigma PAH_{12}$ in scrapings of dried sealcoat ($t = 7$ d) for the current study was higher than that for the 2004 study ($t = 14$ d) by a factor of 6 for CT sealcoat (67,000 and 11,000 mg/kg, respectively) and a factor of 16 for AS sealcoat (1870 and 110 mg/kg, respectively). The difference in PAH concentration in the product therefore might account for the difference in

concentrations in the runoff. PAH concentrations in sealcoat product or scrapings were not reported by Rowe and O'Connor. Third, the test plots used in the Mahler et al. and Rowe and O'Connor studies did not have any vehicle traffic, eliminating the potential for abrasion of dried sealcoat by vehicle tires. Although Rowe and O'Connor reported an increase in SSC with time similar to that noted for this study, they reported a decrease rather than an increase in PAH concentrations, indicating that a source other than abraded sealcoat, such as windblown dust, might have been the source of the particles in the runoff.

Azaarene concentrations in runoff decreased over the days following sealcoat application. One compound, acridine, was present at a concentration associated with acute toxicity (LC50 for the midge *Chironomus riparius* [first instar larvae] of 71.4 μg/L (Bleeker et al., 1998)) in the first sample collected ($t = 5$ h) from CT-sealed pavement (Supplementary material Table S1). Concentrations of carbazole in runoff samples from CT-sealed pavement collected 5 h and 1 d following application were within a factor of 2 of the LC50 of 930 μg/L reported for zebrafish embryos (*Danio rerio*) (Peddinghaus et al., 2012). Concentrations of acridine and carbazole in initial runoff samples from AS-sealed pavement were an order of magnitude or more lower than those in runoff from CT-sealed pavement. Azaarones, products of photo-oxidation of azaarenes, generally are more toxic than the parent compound (de Voogt and Laane, 2009), but were not measured for this study.

The change in the PAH assemblage, from one dominated by LMW PAHs to one dominated by HMW PAHs, likely resulted from volatilization of the LMW PAHs from the dried sealcoat (Van Metre et al., 2012) and mobilization of HMW PAHs as the dried sealcoat began to abrade. The decrease in the concentration of LMW PAHs in runoff is consistent with the decrease in concentration of LMW PAHs in the solid phase over the 36 d following application (Supplementary material Table S2). Although photooxidation accounts for some loss of PAHs from the solid phase, it likely is a small fraction: for example, the increase in concentration of the oxy-PAH 9,10-anthraquinone in dried CT sealcoat scrapings from 112 to 566 mg/kg during the 36 d following application accounts for less than one-tenth of the decrease in anthracene concentration from 6940 to 1320 mg/kg (Supplementary material Table S2). The highest concentrations of LMW PAHs occurred in the earliest samples, which also had the lowest SSC (<10 mg/L). On the basis of estimates using Koc, during the first 2 d (CT) or first 3 d (AS) from 10 to 60% of the mass of LMW PAHs was in the aqueous phase (Supplementary material Table S3). The temporary decrease in $\Sigma PAH_{16}$ in the second sample ($t = 12$ h) from both test plot types might have occurred for two reasons: (1) these samples had the lowest SSC (Table 2), translating to a lower total mass in the solid phase, and (2) they were collected at nighttime when the temperature of the pavement was lower. The solubility of PAHs (and azaarenes) increases with temperature; the median temperature of the pavement for the daytime samples collected during the first 7 d following sealcoat application was 62.1 °C, whereas the pavement temperature when the nighttime sample was collected was estimated to be about 39 °C. (Pavement temperature was not measured when the nighttime sample was collected in August (CT) or September (AS) 2011, but the temperature of recently sealed pavement measured at 10:15 pm September 3, 2013, was 39 °C). The time-series response of azaarene concentrations was similar to that of the LMW PAHs (Supplementary material Table S1), including the decrease in concentrations for the nighttime sample. Although azaarenes are relatively insoluble in cold water, they are readily soluble in hot water (Environment Canada, 2011). The contact of water with hot pavement therefore might increase leaching of PAHs and azaarenes from pavement sealcoat.

Concentrations of the HMW PAHs in runoff from both CT and AS test plots, in contrast to those of the LMW PAHs, generally increased following sealcoat application and are positively related to SSC. A regression of benzo[a]pyrene (BaP) with SSC, for example, has an $r^2$ of 0.84 (CT) or 0.95 (AS) and an intercept that is not significantly different from 0 ($p$-value for intercept > 0.05), indicating that BaP in the aqueous phase was negligible. This interpretation is supported by partitioning estimates based on Koc (Supplementary material Table S3). Regression slopes of 0.58 (CT) and 0.033 (AS) correspond to a BaP concentration associated with particles in runoff of 580 mg/kg and 33 mg/kg for CT and AS runoff, respectively. A BaP concentration of 580 mg/kg for particles in CT runoff is within the upper range of that measured on particles vacuumed from CT-sealed parking lots in Austin (21–671 mg/kg, median 285 mg/kg); a concentration of 33 mg/kg for particles in AS runoff exceeds those measured on particles vacuumed from AS-sealed parking lots by about 2 orders of magnitude (0.06–0.6 mg/kg, median 0.56 mg/kg) (Mahler et al., 2010). The increase in concentrations of HMW PAHs, then, corresponds to an increase in SSC as the sealcoat begins to wear and abraded sealcoat particles become entrained in runoff. SSC measured for this study was about twice as high as that measured by Rowe and O'Connor (2011) and 2 to 3 times higher than that measured by Mahler et al. (2004) at similar intervals after sealant application, indicating the effect of vehicle traffic on SSC, and, therefore, PAH concentration, loads, and yields. SSC measured here, however, was not as high as that measured in runoff from in-use sealed parking lots with sealant applied months to years earlier (Mahler et al., 2004). PAH concentrations and loads in runoff, therefore, might increase as sealcoat ages and is abraded by vehicles. Additionally, the higher intensity of natural storms might mobilize particles more aggressively than the simulated rainfall used here, and might therefore contribute to higher SSC and PAH concentrations.

The evolution of the chemical assemblage in runoff over the first 36 d following sealcoat application to one that contains predominantly particle-associated HMW PAHs has implications for the fate and transport of chemicals associated with runoff from sealed pavement. Chemicals in the aqueous phase will not be retained by stormwater ponds or other stormwater management structures, and therefore might contaminate downstream water bodies. The presence of aqueous-phase chemicals in receiving water bodies in response to runoff events, however, will be transient, as the chemicals are diluted, move downstream, or are degraded by photolysis or by microorganisms. Additionally, chemicals in the aqueous phase can leach into shallow groundwater, particularly in highly vulnerable aquifers such as karst, where there is a direct and rapid connection between surface water and groundwater. Concentrations of individual PAHs in uncontaminated groundwater usually are in the range of 0–5 ng/L, but at heavily contaminated sites exceed 10 μg/L (World Health Organization, 2003). Contamination of groundwater by azaarenes has been well documented for sites contaminated with coal-tar oils or creosote (International Agency for Research on Cancer, 1999; Hartnik et al., 2007; Reineke et al., 2007). In contrast, particle-associated HMW PAHs tend to collect in soils and in streambed and lake sediment, where, because of their persistence, they can remain for many years. For example, soil contaminated by PAHs from coal tar at old manufactured gas plants (MGPs) continues to present an expensive contamination problem decades after these plants were shut down (Hawthorne et al., 2002).

The decrease over time in concentrations of aqueous-phase LMW and the increase in concentrations of particle-associated HMW PAHs in sealcoat runoff has implications for ecotoxicology. LMW PAHs can be acutely toxic to aquatic organisms, whereas the HMW PAHs are appreciably less toxic than the LMW PAHs, but

many HMW PAHs are carcinogenic, mutagenic, or teratogenic to a wide variety of organisms, including fish, amphibians, birds, and mammals (Eisler, 1987). Azaarenes are more water soluble than PAHs and therefore are likely to be more bioavailable (Pearlman et al., 1984). The shift from aqueous-phase compounds to particle-associated compounds at about 7 d after CT sealcoat application therefore might correspond to a shift from acute toxicity to chronic toxicity and other ecotoxicological effects, such as cyto- and genotoxicity.

## 5. Conclusions and implications

Concentrations of PAHs in runoff from CT-sealed pavement remained high for weeks to months following sealcoat application, but the assemblage evolved to one predominantly composed of particle-associated HMW PAHs. This evolution might have important ecotoxicological implications, as LMW are acutely toxic and HMW are mutagenic, teratogenic, and carcinogenic. Elevated concentrations of aqueous-phase LMW PAHs and azaarenes during the first 7 d following application indicate a potential source of contamination to groundwater, and hot summer temperatures might increase leaching of these chemicals from the sealcoat. This study is the first, to our knowledge, to document elevated concentrations of azaarenes associated with use of CT sealcoat. Because of the extensive use of CT-sealcoat products in North America, azaarene contamination might be more widespread than previously considered. Finally, this study demonstrates that sealcoat products marketed as containing only asphalt might contain some CT sealcoat at up to several percent by weight, and might therefore contain PAHs at concentrations one to two orders of magnitude higher than a true asphalt-based product.

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## Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.envpol.2014.01.008.

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ATTACHMENT #10

This was sent in the mail unsolicited. I called and spoke to "Megin"
I asked if there was cold tar in their products and her response was "are you concerned because of all the articles in the papers because in mid May we will offer a non-cold tar and low PAH product but will cost $30 more."

BARRECA BLACKTOP SEALCOATING, INC.
P.O. BOX 8202
NORTHFIELD, IL 60093-8202

TEL: 847-970-5900
FAX: 847-970-5901

WWW.BarrecaBlacktop.COM
Your customer code is B254-1105-5745
( for internet scheduling )

## Proposal/Contract

T930 P1

ADELMAN
OR CURRENT RESIDENT
1185 LAUREL AVE
WINNETKA, IL 60093-1819

RECEIVE $10.00 DISCOUNT IF WORK SCHEDULED BY JULY 5, 2014

SCHEDULE ONLINE AT WWW.BarrecaBlacktop.COM AND RECEIVE AN ADDITIONAL $5.00 DISCOUNT

**Premium Seal Coat method to be used:**

_X_ High Power Sweep Asphalt _X_ Seal all major cracks _X_ Hand Brush Applied
_X_ Apply one coat of Commercial Grade™ Emulsion Sealer ___ Patching (if needed)

Visa/MasterCard Also Accepte

#_____

Expiration Date_____

| | |
|---|---|
| Seal Coating: | $275.00 |
| Crack Sealing: | INCLUDED |
| TOTAL: | $275.00 |

Products used:

**Commercial Grade™ Emulsion Sealer**
Beautifies asphalt pavements
Retards oxidation
Fuel and oil resistant
Weather proofs
Increases wearability
Protects longer
Increases asphalt life

**Black Beauty™ Aggregate**
Seals minor imperfections in asphalt

**TarMax™** A unique admixture to improve coal tar emulsion.
Lasts longer
Resists wear
Dries blacker
Resists oil and gas spills

**Commercial Grade™ Crack Sealant**
Commercial Grade Sealant provides excellent adhesion to crack walls for long lasting protection

Check your arrival time the morning of your scheduled work at WWW.BarrecaBlacktop.COM

**HAND BRUSH APPLIED**

_____ Signature

_____ Date

04/15/2014
B254-1105-5745

_____ Phone

SEQ # 75329