Agenda Item Executive Summary

Title: Ordinance No. MC-7-2014: Implementing a Ban on Coal Tar-Based Pavement Sealants- Adopt

Presenter: Steven M. Saunders, Director of Public Works/Village Engineer

Agenda Date: 08/19/2014

Consent: ☐ YES ☑ NO

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

Item History:

April 8, 2014 Council Study Session
July 8, 2014 Council Study Session
August 5, 2014 Council Meeting

Executive Summary:

During the review of the Stormwater Master Plan and related stormwater improvement projects, a ban on the use of coal tar sealants as a potential local environmental regulation was discussed. 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.

The WEFC met on four occasions in April, May, and June of 2014 to study and discuss the issue, and at the July 8, 2014 Study Session the WEFC recommended that the Village Council consider banning the use of coal tar-based sealers in the Village of Winnetka. The WEFC recommended implementing the ban by requiring commercial applicators to obtain a license to apply pavement sealant products, and to sign an affidavit not to apply coal tar-based sealant materials. The WEFC also recommended that the Village engage in a robust education effort to make residents and contractors aware of the ban, and communicate the reasons for banning the material.

The Village Council discussed the matter and concurred with the WEFC's recommendation, however the Council wished to make the ban more general, noting that the licensing approach would not apply to residents applying the material to their own driveways. Pursuant to Council direction, staff has prepared an Ordinance that would implement a general ban on coal tar-based pavement sealants. Ordinance No. MC-7-2014 modifies the Village Code to require licensing of commercial sealant applicators and to include coal tar-based sealants in the definition of public nuisances. The Council introduced Ordinance MC-7-2014 at the August 5, 2014 Council meeting.

At the August 5 meeting, the Council requested that speakers could offer additional information for consideration. Attachment #3 was received from the Pavement Coatings Technology Council (PCTC); the PCTC has also requested time before the Council to present and answer questions. Attachment #4 was received from Coal Tar Free America. These materials have not been reviewed by Staff, but are included as information for the Council's process.

Recommendation:

Consider adoption of Ordinance No. MC-7-2014, implementing a ban on coal tar-based pavement sealants.

Attachments:

1. Agenda Report
2. Ordinance No. MC-7-2014
3. Pavement Coatings Technology Council Information Submittal
4. Coal Tar Free America Information Submittal

Agenda Report

Subject: **MC-7-2014: Implementing a Ban on Coal Tar-Based Pavement Sealants**

Prepared By: Steven M. Saunders, Director of Public Works/Village Engineer

Date: August 13, 2014

Ref: April 8, 2014 Council Study Session
July 8, 2014 Council Study Session
August 5, 2014 Council Meeting

Background

During the review of the Stormwater Master Plan and related stormwater improvement projects, a ban on the use of coal tar sealants as a potential local environmental regulation was discussed. 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 wear 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.

The WEFC met on four occasions in April, May, and June of 2014 to study and discuss the issue, and at the July 8, 2014 Study Session the WEFC recommended that the Village Council consider banning the use of coal tar-based sealers in the Village of Winnetka. The WEFC recommended implementing the ban by requiring commercial applicators to obtain a license to apply pavement sealant products, and to sign an affidavit not to apply coal tar-based sealant materials. The WEFC also recommended that the Village engage in a robust education effort to make residents and contractors aware of the ban, and communicate the reasons for banning the material.

The Village Council discussed the matter and concurred with the WEFC's recommendation, however the Council wished to make the ban more general, noting that the licensing approach would not apply to residents applying the material to their own driveways. Pursuant to Council direction, staff has prepared an Ordinance that would implement a pavement sealant applicator license program along with a general ban on coal tar-based pavement sealants. Ordinance MC-7-2014 **(Attachment #1)** modifies the Village Code as follows:

Add Chapter 74 in Title 5:

5.74. Pavement Sealant Applicators.

*A. License. No person shall apply pavement or pavement sealing products ("**Sealant**") to any public or private property within the Village without a license ("**Pavement Sealant License**"), which License shall be renewed annually. A Pavement Sealant License shall not be required for a property owner applying Sealant to pavement on a single-family lot owned by the property owner. Application for a Pavement Sealant License shall be on a form provided by the Village and shall, at a minimum, state the name, address, and contact information of the person applying for the License and the person or persons who will be applying the Sealant, and such other information as may be required by the Village Manager.*

*B. Certification; Previous Services. All persons applying for a Pavement Sealant License shall (i) sign a certification on a form provided by the Village, certifying, at a minimum, that neither the licensee nor any person acting under the License will apply products that contain coal tar, coal tar derivatives, or coal tar mixtures ("**Coal Tar Products**") to any public or private property within the Village, and (ii) upon the Village's request, provide a written list of locations where the licensee or any person acting under the licensee has provided applied Sealant to any public or private property within the Village within the preceding 365 days.*

C. Fee. All applications for a Pavement Sealant License shall be accompanied by the annual license fee, which shall be set from time to time by resolution of the Village Council.

D. Review and Approval. The Director of Public Works shall review all applications for Pavement Sealant Licenses and shall make a recommendation to the Village Manager for each application. The Village Manager shall grant a Pavement Sealant License if the application complies with all applicable provisions of this Chapter and the Village Code.

A new number 17 in Section 9.16.020 B:

17. The application after ***[insert effective date]*** *of pavement or pavement sealing products that contain coal tar, coal tar derivatives, or coal tar mixtures ("**Coal Tar Products**") to any public or private property within the Village. Abatement of this nuisance shall consist, at a minimum, of sealing over the Coal Tar Products with an asphalt-based product free of coal tar.*

The proposed language retains the recommended licensing for commercial applicators and expands the Village Code language on Public Nuisances to include coal tar-based sealers. If the Village Council ultimately adopts MC-7-2014, staff proposes to focus very heavily on education during the remainder of the 2014 pavement season. Education will include contacting pavement sealer applicators, e-Winnetka updates, using the Village's website, the Winnetka Report, and other means. During the 2015 construction season, staff will conduct a data gathering effort using refuse collectors to identify the number of driveways being sealed during the year. Property owners will be contacted for a follow-up survey to determine whether the sealant was self-applied or a commercial applicator was used, whether the property owner is aware of the ban, and whether the material applied was asphalt-based or coal tar-based. Data would be used to evaluate the effectiveness of public education and to refine enforcement procedures for coming years.

Enforceable licensing requirements for commercial applicators would be implemented for the 2015 construction season, and enforcement for commercial applicators will be related to whether or not an applicator possesses a license. For residential property owners who self-perform sealant application, staff anticipates that enforcement would begin in the 2015 construction season and focus primarily on issuances of warnings combined with educational materials for the first year, to be fine-tuned based on data-gathering from the 2015 season.

The Village Council introduced Ordinance MC-7-2014 at the August 5, 2014 Council meeting.

Recommendation:
Consider adoption of Ordinance MC-7-2014 implementing a ban on coal tar-based pavement sealants.

Attachments:
1. Ordinance MC-7-2014

ORDINANCE NO. MC-7-2014

AN ORDINANCE AMENDING TITLE 5 AND SECTION 9.16.020 OF THE WINNETKA VILLAGE CODE REGARDING A BAN ON COAL TAR PRODUCTS AND THE APPLICATION OF PAVEMENT SEALANTS WITHIN THE VILLAGE

WHEREAS, the Village of Winnetka is a home rule municipality in accordance with Article VII, Section 6 of the Constitution of the State of Illinois of 1970 and has the authority to exercise any power and perform any function pertaining to its government and affairs; and

WHEREAS, Title 5 of the Winnetka Village Code, as amended (***"Village Code"***), titled "Business Licenses and Regulations," sets forth certain regulations governing the licensing and operation of businesses within the Village (***"Business Regulations"***); and

WHEREAS, Section 9.16.020 of the Village Code, titled "Public nuisances defined," identifies certain activities that, when conducted within the Village, are deemed to be public nuisances punishable by certain penalties and that must be abated (***"Nuisance Regulations"***); and

WHEREAS, the Village desires to update: (i) the Business Regulations to require all persons engaged in the business of applying pavement sealing products to public or private property within the Village to obtain a Village license; and (ii) the Nuisance Regulations to declare a public nuisance the application of any pavement sealing product that contains coal tar, coal tar derivatives, or coal tar mixtures to any public or private property within the Village; and

WHEREAS, the Village Council has determined that amending the Business Regulations and the Nuisance Regulations as set forth in this Ordinance is in the best interests of the Village;

NOW, THEREFORE, be it ordained by the President and Board of Trustees of the Village of Winnetka as follows:

SECTION 1: The foregoing recitals are hereby incorporated as the findings of the Council of the Village of Winnetka, as if fully set forth herein.

SECTION 2: Title 5, titled "Business Licenses and Regulations," of the Village Code is hereby amended by adding a new Chapter 5.74, titled "Pavement Sealant Applicators," which new Chapter will read as follows:

Chapter 5.74
PAVEMENT SEALANT APPLICATORS

Section 5.74.010 License.

No person shall apply pavement or pavement sealing products ("Sealant") to any public or private property within the Village without a license ("Pavement Sealant License"), which License shall be renewed annually. A Pavement Sealant License shall not be required for a property owner applying Sealant to pavement on a single-family lot owned by the property owner. Application for a Pavement Sealant License shall be on a form provided by the Village and shall, at a minimum, state the name, address, and contact information of the person applying for the License and the person or persons who will be applying the Sealant, and such other information as may be required by the Village Manager.

Section 5.74.020 Certification; previous services.

All persons applying for a Pavement Sealant License shall (i) sign a certification on a form provided by the Village, certifying, at a minimum, that neither the licensee nor any person acting under the License will apply products that contain coal tar, coal tar derivatives, or coal tar mixtures ("Coal Tar Products") to any public or private property within the Village, and (ii) upon the Village's request, provide a written list of locations where the licensee or any person acting under the licensee has applied Sealant to any public or private property within the Village within the preceding 365 days.

Section 5.74.030 Fee.

All applications for a Pavement Sealant License shall be accompanied by the annual license fee, which shall be set from time to time by resolution of the Village Council.

Section 5.74.040 Review and approval.

The Director of Public Works shall review all applications for Pavement Sealant Licenses and shall make a recommendation to the Village Manager for each application. The Village Manager shall grant a Pavement Sealant License if the application complies with all applicable provisions of this Chapter and the Village Code.

SECTION 3: Subsection B, titled "Pubic Nuisances Affecting Health," of Section 9.16.020, titled "Public nuisances defined," of Chapter 9.16, titled "Nuisances," of Title 9, titled "Public Peace, Morals and Welfare," of the Village Code is hereby amended by amending a new Paragraph 17, which new Paragraph will read as follows:

17. The application after _____, 2014, being the effective date of this Paragraph, of pavement or pavement sealing products that contain coal tar, coal tar derivatives, or coal tar mixtures (***"Coal Tar Products"***) to any public or private property within the Village. Abatement of this nuisance shall consist, at a minimum, of sealing over the Coal Tar Products with an asphalt-based product free of coal tar.

SECTION 4: This Ordinance is passed by the Council of the Village of Winnetka in the exercise of its home rule powers pursuant to Section 6 of Article VII of the Illinois Constitution of 1970.

SECTION 5: This Ordinance shall take effect immediately upon its passage, approval, and posting as provided by law.

PASSED this_____day of _____, 2014, pursuant to the following roll call vote:

AYES: _____

NAYS: _____

ABSENT: _____

APPROVED this ____ day of _____, 2014.

Signed:

_____
Village President

Countersigned:

_____
Village Clerk

Published by authority of the President and Board of Trustees of the Village of Winnetka, Illinois, this ___ day of _____, 2014.

Introduced: August 5, 2014

Passed and Approved: _____, 2014

Submitted to State of Illinois for posting: _____, 2014

ATTACHMENT #3

PAVEMENT COATINGS TECHNOLOGY COUNCIL:

INFORMATION SUBMITTAL

Pavement Coatings Technology Council

WWW.PAVEMENTCOUNCIL.ORG

AGENDA PACKET
INFORMATION ABOUT REFINED TAR-BASED PAVEMENT SEALANTS (RTS)
FOR
VILLAGE OF WINNETKA, ILLINOIS
REGULAR VILLAGE COUNCIL MEETING

AUGUST 19, 2014

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CONTRARY TO THE CLAIMS OF ALARMISTS, RTS IS ALREADY APPROPRIATELY REGULATED

Pavement Maintenance & Reconstruction Magazine
(http://www.forconstructionpros.com/pavement-maintenance)

By A. LeHuray
7/28/2014
2014 Column #6 to appear in Next Issue (editorial adjustments not yet made)

The "How Laws are Made in Minnesota" series is not yet complete but I'm interrupting the Minnesota series to explain some of the laws and regulations that apply to coal tar and distillation fractions such as RT-12, the ingredient used in the manufacture of RTS, and how alarmists use misleading tactics to convince the unwary that regulations are inadequate.

Environmental activist groups that agitate for regulation of RTS and other substances are making the claim that the USEPA and other agencies are not doing an adequate job of regulating chemicals in products. Many of these groups want the government to regulate on the basis of hazard rather than risk. In the world of regulation, the word "hazard" has a specific meaning, referring to an inherent property of a substance that, in certain circumstances can be dangerous. Water, for example, is a drowning hazard, can make you sick if ingested in excess, and can be really dangerous when frozen. Take a look at this website about dihydrogen monoxide – the chemical name for water. The website authors use language to describe facts about water that make it sound scarily dangerous, so much so that the government seems negligent for allowing it to be so unregulated.

The same type of fear-mongering tactics are used by the advocates of RTS bans. In presentations, writings and web sites, USGS staff scientists and their followers never fail to point out hazard listings of coal tar without mentioning the circumstance in which the hazard may be associated with an actual risk that needs to be managed– that is, high temperature industrial settings. . It is appropriate to question the USGS when they claim that they are not engaged in advocacy because, in the case of RTS, the USGS is aligned with the most extreme anti-chemical activists in using hazard listings, regulations based on hazard listings such as OSHA's Hazard Communications (HazCom) rules and manipulated exposure circumstances as tools to communicate unwarranted alarm.

Regulation of chemicals in the US is comprehensive with dozens of overlapping programs at the federal level alone. Those that most visibly impact RTS include OSHA's HazCom which require disclosure of hazards via MSDS and the labels that comes with sealants of all varieties. Of course, OSHA's comprehensive worker health and safety regulations also apply to sealant from manufacture to application.

Refined tar- and asphalt-based emulsions are both mixtures of ingredients, which means the ingredients are individually regulated by EPA via the Toxic Substances Control Act (TSCA). EPA also administers the Resource Conservation and Recovery Act (RCRA) which regulates waste materials from cradle to grave. RCRA exempts coke oven byproduct materials that are recycled to the "tar recovery process as a feedstock to produce coal tar, or mixed with coal tar prior to the tar's sale or refining" from hazardous waste regulation because refined coal tar does not exhibit any of the toxicity characteristics used by RCRA to identify hazardous wastes.

In addition to the coal tar generated as a coke oven byproduct, coal tars were produced during the now-defunct process of manufacturing gas from coal for use as a source of energy in municipalities across North America. Hundreds of former gas plants (MGP) around the country are listed as "hazardous waste sites," not because of the coal tar but because of substances mixed in with the coal tar that do have toxicity characteristics. EPA and the courts have issued opinions that, unless a material displays toxicity characteristics because other substances are present, "MGP remediation wastes [that is, coal tar] are unlikely to be RCRA hazardous waste under the federal program, and would not be required to meet RCRA requirements, including Land Disposal Restriction requirements."

RT-12 has been tested and does not meet the RCRA hazardous waste criteria. RTS also passes EPA's toxicity characteristic test, indicating that RTS does not meet the criteria to be a hazardous waste and disposal in non-hazardous waste landfills is appropriate.

Coal tar and fractional distillates of coal tar are specifically designated "Generally Recognized as Safe and Effective" in FDA regulations for use in over-the-counter skin medications. FDA's Cosmetic Ingredient Review process has, however, not approved use of coal tar in cosmetics, so today you won't find the coal tar eye liner that was used in the distant past.

So even if RTS were an important source of PAHs in storm water detention pond sediments – which science has shown to be unlikely in Minnesota - the MN Pollution Control Agency's claim that the sediment must be disposed in hazardous waste landfills because of the use of RTS would not the case if Minnesota were to follow federal standards.

The goal of regulation is to promote the health and safety of the public and the environment. In the case of pavement sealers, federal regulations have been shown to be effective at achieving these goals.

DRAFT

Frequently Asked Questions

ASPHALT PARKING LOTS ARE CAPITAL INVESTMENTS

Asphalt parking lots and driveways are capital investments, increasing the value and functionality of a property. Like any infrastructure investment, the asphalt surface must be maintained to keep both value and functionality over time.

WHAT ARE THE MAINTENANCE OPTIONS?

Maintenance options include resurfacing or replacing the asphalt periodically and extending the service life of the asphalt by sealcoating.

WHAT DOES SEALCOATING DO?

Sealcoating extends the useful life of the capital asset – an asphalt parking lot – by protecting the pavement from the natural aging process caused by sunlight, water and debris. Sealcoat also protects pavement from degradation caused by leaking oil and gasoline and other caustic products. An added benefit is that sealcoating adds to the “curb appeal” of a paved surface, giving it a clean, uniform look.

WHAT ARE THE OPTIONS FOR SEALCOATING?

There are two essential options for sealcoating: refined coal tar-based sealers and asphalt-based sealers. Other options are cost-prohibitive for most applications.

WHERE DOES THE BASE MATERIAL FOR SEALERS COME FROM?

Refined coal tar-based sealers are based on a selectively refined fraction of crude coke oven tar, which is a byproduct of the steel making process. Similarly, asphalt-based sealers are based on a selectively refined fraction of crude oil.

HOW ARE PAVEMENT SEALERS MADE?

The majority of pavement sealers are an emulsion, a mixture typically consisting of water, clay, sand, polymers and usually less than 20% of either asphalt or refined coal tar.

HOW LONG HAVE PAVEMENT SEALERS BEEN IN EXISTENCE?

Pavement sealers have been applied for over six decades. Sealing is a tried and true way to protect and beautify a pavement, prolonging its useful life and minimizing the need to replace the asphalt, which consumes a lot of energy (fuel to manufacture, deliver and install) and natural resources.

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MOST SEALER MANUFACTURERS SELL BOTH TYPES OF SEALER, SO WHY DO THEY CARE WHICH ONE IS USED?

Most sealer manufacturers make both refined coal tar-based products and asphalt-based products. Even though most sealer manufacturers make both, most recommend refined coal-tar based for most applications because the superior performance of tar-based sealcoat allows the manufacturers to stand behind the performance of their products, enhancing the reputations of their businesses. Research and development projects continue to improve the performance of asphalt-based sealer, but there remains a way to go.

WHY REFINED COAL TAR-BASED SEALER?

Refined coal tar-based sealers (1) protect the underlying asphalt pavement from leaking oil and gas spills, (2) last longer than asphalt-based sealer, (3) are more resistant to natural aging processes caused by exposure to the elements (sun, rain, freeze-thaw, etc.), (4) adhere (that is, “sticks”) to the underling pavement better, and (5) are manufactured to a performance-based specification (ASTM® D490).

WHAT IS THE PERFORMANCE DIFFERENCE BETWEEN TYPES OF SEALERS?

Asphalt-based sealers have many of the same beneficial properties as refined coal tar-based sealers. The tar-based product, however, is superior in strength, resistance to leaks/spills of petroleum products, UV bleaching and road salts.

WHAT IS REFINED COAL TAR?

One of the byproducts of manufacturing steel in coking ovens is coal tar. Out of the coking oven, this material is “crude coal tar” which, like “crude oil,” serves as a raw material that is distilled into many different fractions in coal tar refineries. The different fractions are then used to make many different products.

ARE PAVEMENT SEALERS HAZARDOUS?

Air sampling studies showed refined coal tar based sealers pose no inhalation risk to applicators, manufacturers or the general public. People with skin conditions have been applying coal tar creams and lotions (not pavement sealers, but still, a coal tar-based product) directly to their skins on purpose for a century or more with few reported problems. Research with insurance carriers (both in liability and workers compensation) shows a general paucity of insurance claims over the history of sealer use.

WHAT PRECAUTIONS SHOULD BE TAKEN WHEN APPLYING RTS EMULSIONS?

If RTS emulsions contact skin during application in the presence of sunlight, they can irritate the skin

and applicators can experience moderate to severe “sunburn” effects if they do not wear appropriate clothing including long sleeve shirts, long pants and work gloves. Depending on the method of application and weather conditions a hat and face shield may be appropriate. Protective creams are available to minimize skin contact with sealer and to block the sun’s ultraviolet rays that can enhance skin irritation. When proper handling and personal hygiene precautions are observed skin irritation should not be a significant problem.

DO REFINED COAL TAR-BASED SEALERS CAUSE CANCER?

Some activists say that refined tar-based sealers are a health threat, but across the two, three and four generation memories of the many family-owned companies in the business of making or applying sealcoat, there are no reports of adverse chronic health effects – including cancer - that can be attributed to exposure to sealcoat.

DO OTHER PRODUCTS MADE FROM REFINED COAL TAR CAUSE CANCER?

Expanding the search for evidence of cancer to other products made from refined tar, every day millions of people world-wide use coal tar soaps, shampoos and creams approved for use as over-the-counter medicines to treat skin disorders such as eczema, psoriasis and dandruff. Coal tar and coal tar derivatives are listed by the US Food and Drug Administration (FDA) as “generally recognized as safe and effective” active ingredients for use to treat these skin ailments with coal tar concentrations up to 5% in over-the-counter products. Because of its use in medicines, many studies have been performed over nearly a century to see if the patients who intentionally expose themselves to high level doses of coal tar for long periods of time have increased risk of cancer. All the studies have reached the same conclusion – there is no evidence of cancer.

WHAT DO STUDIES OF PEOPLE EXPOSED TO NON-PHARMACEUTICAL COAL TAR SHOW?

Studies of humans exposed to coal tar (other than via medicinal coal tar products) can be summarized as follows:

• There is no evidence that low level or intermittent exposure to coal tar or coal tar pitch has caused cancer in humans. This category describes exposures to refined coal tar-based sealer.

• There is little evidence that high level, repeated exposures has caused cancer in humans. This evidence is largely reports from the past, such as chimney sweeps in London in the 18th century (but not chimney sweeps in other countries at about the same time) and late 19th – early 20th century factories, at a time when industrial hygiene practices were virtually non-existent. The working conditions described in these reports include exposures to many chemicals in addition to coke and coal tar.

• There are some studies conducted in modern factories with high temperature (1000s of degrees

Fahrenheit) industrial processes such as aluminum smelting or coke oven gases that show some adverse effects.

I'VE HEARD THAT COAL TAR IS LISTED AS A "KNOWN CARCINOGEN." WHAT ABOUT THAT?

Because of the observations discussed in the previous paragraph, occupational exposures to coal tar and coal tar pitch in high temperature industrial settings have been listed as carcinogens by the International Agency for Research on Cancer (IARC). The listing is specifically for those very high temperature occupational settings, and is NOT for intermittent, incidental low to moderate temperature exposures such as might be associated with pavement sealer.

Similar to health agencies elsewhere in the world, the US FDA lists coal tar as "generally recognized as safe and effective" for sale as an over-the-counter (no prescription needed) skin medication. The FDA has found no evidence that coal tar causes cancer.

As discussed later on, there is a conflict between regulations based on actual human exposures to coal tar and those based on exposures of laboratory animals to laboratory-made compounds, for example in some states such as Minnesota.

IS COAL TAR REGULATED AS A HAZARDOUS SOLID WASTE IN THE US?

In the US, the Resource Conservation and Recovery Act (RCRA) regulates waste materials "from cradle to grave." RCRA exempts coke oven byproduct materials that are recycled to the "tar recovery process as a feedstock to produce coal tar, or mixed with coal tar prior to the tar's sale or refining" from hazardous waste regulation because refined coal tar does not exhibit any of the toxicity characteristics used by RCRA to identify hazardous wastes.

In addition to the coal tar generated as a coke oven byproduct,coal tars were produced during the now-defunct process of manufacturing gas from coal for use as a source of energy in municipalities across the North American continent. Hundreds of former manufactured gas plants (MGP) around the country are listed as "hazardous waste sites," not because of the coal tar but because of substances mixed in with the coal tar that do have toxicity characteristics. The US EPA and federal courts have issued opinions that, unless a material displays toxicity characteristics because other substances are present, "MGP remediation wastes [that is, coal tar] are unlikely to be RCRA hazardous waste under the federal program, and would not be required to meet RCRA requirements, including Land Disposal Restriction requirements."

Refined coal tar that is the base material used to make pavement sealer has been tested and does not meet the RCRA hazardous waste criteria. Different brands of pavement sealcoat emulsion tested at

different times in different labs have all passed EPA's toxicity characteristic test, indicating that RTS does not meet the criteria to be a hazardous waste and disposal in non-hazardous waste landfills is appropriate.

WHAT IS THE CONNECTION BETWEEN COAL TAR AND PAHS?

The FDA evaluated safety of coal tar based on exposure of humans to medicinal products that contain coal tar. Controversies about the safety of refined coal tar-based sealer began because one of the components of coal tar-derived materials is a class of chemical compounds called polycyclic aromatic hydrocarbons (PAHs). Cancer classifications of PAHs by environmental agencies typically evaluate how laboratory animals such as rats and mice react when exposed to high doses of individual PAH compounds made in a laboratory. Test results in laboratory animals exposed to laboratory-made compounds are then used by regulatory agencies to make assumptions about how humans might react if exposed to PAH-containing materials.

Thus there is a conflict between regulations based on actual human exposures to real-world substances and regulations or guidance based on exposures of laboratory animals to substances that no one (except maybe laboratory technicians) is actually exposed to.

In the US, the Environmental Protection Agency recognizes that there are thousands of products and foods that contain some mixture of PAHs. Testing each one would be prohibitively expensive. So EPA's solution has been to develop methods of estimating risks that could be associated with products containing PAHs by extrapolating from laboratory animals to humans based on calculations of PAHs contained in a food or product. How the PAH compounds that are part of the make-up of coal tar and, to greater and lesser extents, of coal tar derivatives, could be calculated to cause effects so different from those seen in people exposed to products containing refined coal tar is a matter for academic study.

WHERE ELSE ARE PAHS FOUND?

PAHs occur naturally; they are all around us and always have been. PAHs are made whenever something organic is heated up or burned. Smoke from forest fires and wood burning fire places contains PAHs. Plants decaying in a swamp or a compost pile are making PAHs. Emissions from planes, trains and automobiles, cooking food, lubricating oils, volcanic eruptions – PAHs are in all those substances as well as in materials derived from coal tar. This means that PAHs are everywhere in our environment. PAHs have been around since the dawn of man. If there was a fire that offered our ancestors warmth or light, or cooked their food, PAHs were present.

WHY IS REFINED COAL TAR-BASED SEALER NOT USED AS MUCH ON THE WEST COAST?

Crude coal tar is a byproduct of making steel. The steel industry is largely located east of the Rocky Mountains. To be close to the source of their raw materials, coal tar refineries that make the base material for refined coal tar-based sealer are located near where steel has historically been made. Transportation costs and the more arid climates make locally produced asphalt-based sealers the cost effective choice on the west coast.

ARE ASPHALT-BASED SEALERS CHEAPER?

All else being equal, asphalt-based sealers are generally cheaper on the west coast, but not in the Midwest or east. The pricing of the asphalt-based product tends to be a little more volatile, as it fluctuates with the price of crude oil. Another cost factor can be that manufacture of refined tar-based emulsion is a one stage process, requiring fewer additives whereas making asphalt-based emulsion requires at least two stages and more additives and chemical fortifiers that enhance performance.

IS THERE A DIFFERENCE BETWEEN "DRYING" AND "CURING" SEALER?

Like latex paints, sealer is applied as a water-based emulsion. All emulsions contain water. Evaporation of the water starts the process of "sticking" the sealcoat particles to each other and to the coated pavement. Sealer that is dry to the touch means that the surface can be open to foot traffic, but not vehicle traffic. Sealcoat can be driven on once the process of curing is well underway, meaning that the sealer particles are sticking to each other and the pavement. Curing takes more time than drying because it takes longer to drive out moisture that remains after the initial drying.

WHY CAN YOU SOMETIMES STILL SMELL THE SEALCOAT EVEN AFTER ITS OPEN TO TRAFFIC?

The odor of refined tar-based sealer is easily identifiable, for good reason: refined tar-based sealer has a very distinct odor, and the human nose is able to detect it at extremely low concentrations. But just because it may smell bad doesn't mean it is bad!

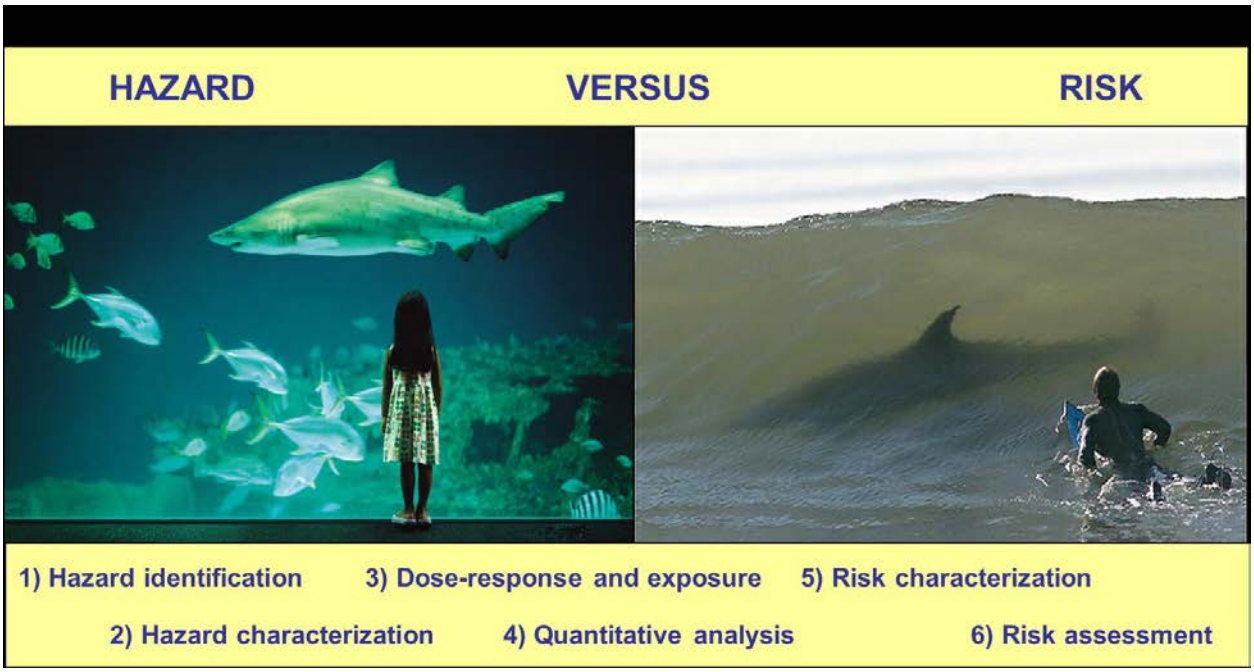
The smell is primarily the presence of one substance among the many that are part of refined tar-based sealer – naphthalene. The odor threshold for naphthalene is below three parts per billion (ppb), a very low concentration. To put this concentration into perspective, the odor threshold for nail polish remover is 7,000.

According to the American Conference of Governmental Industrial Hygienists, the level of naphthalene that is considered safe for workers is ten thousand parts per billion. So the difference between being able to smell it and worrying about it is huge – four orders of magnitude, to be exact. Even refined tar-based sealer workers don't experience those levels of exposure.

WHY IS SEALCOATING NOT RECOMMENDED IF THE WEATHER IS COLD OR IT'S GOING TO RAIN?

For the same reason that exterior painting is not recommended in cold or wet weather, sealcoat is not applied in those conditions because the water in the emulsion won't evaporate. If the water doesn't evaporate, sealcoat particles can't begin the curing process of sticking to each other and the coated surface.

HAZARD VERSUS RISK



Environmental activist groups that promote regulation of RTS and other substances are making the claim that the USEPA and other agencies are not doing an adequate job of regulating chemicals in products. Many of these groups want the government to regulate on the basis of **hazard** rather than **risk**. In the world of regulation, the word "**hazard**" has a specific meaning, referring to an inherent property of a substance that, in certain circumstances can be dangerous. Water, for example, is a drowning **hazard**, can make you sick if ingested in excess, and can be really dangerous when frozen. Take a look at this spoof website about dihydrogen monoxide – the chemical name for water. The website authors use language to describe facts about water that make it sound scarily dangerous, so much so that the government seems negligent for allowing it to be so unregulated.

The same type of fear-mongering tactics are used by the advocates of RTS bans. In presentations, writings and web sites, pro-ban advocates never fail to point out **hazard listings** of coal tar without mentioning the circumstance in which the **hazard** may be associated with an **actual risk** that needs to be managed– that is, high temperature industrial settings. . In the US, it is typically the most extreme anti-chemical activists that use alarmist techniques such as using hazard listings, regulations based on hazard listings such as OSHA's Hazard Communications (HazCom) rules and manipulated exposure circumstances as tools to communicate unwarranted fear.

Unlike most materials that might be released into the environment, there are lots of data about human exposure to high concentrations of coal tar because of its pharmaceutical uses. The US Food & Drug Administration (FDA) classifies coal tar and coal tar derivatives as "Generally Recognized as Safe and Effective" and authorizes use in Over-the-Counter skin care products (that is, no prescription needed) at concentrations up to 5% coal tar.

Patient undergoing coal tar application as part of Goeckerman treatment.
Photo courtesy of the University of Michigan Health System

The photograph on the left shows that, under supervision of a physician in a clinical setting, patients are exposed to refined coal tar (very high concentrations of PAHs) at much higher concentrations in a procedure known as Goeckerman treatment. More information about this procedure can be found at the web site of the National Psoriasis Foundation.

Indeed, there are **hazards** that are thought to translate into **actual risks** associated with occupational exposures to coal tar or coal tar pitches (and the PAHs contained therein) in high-temperature (1000s of degrees C) industrial processes. Classification as a "known human carcinogen" applies ONLY to workers in high-temperature industrial settings.

A more complete description of what the data show about non-pharmaceutical human exposures to coal tar and its derivatives can be summarized as follows:

- There is no evidence that low level or intermittent exposure to coal tar or coal tar pitch has caused cancer in humans. This category describes exposures to refined coal tar-based sealer.
- There is little evidence that high level, repeated exposures has caused cancer in humans. This evidence is largely reports from the past, such as chimney sweeps in London in the 18th century (but interestingly, not chimney sweeps in other countries at about the same time) and late 19th – early 20th century factories, at a time when industrial hygiene practices were virtually non-existent. The working conditions described in these reports include exposures to many chemicals in addition to coke and coal tar.
- There are some studies conducted in modern factories with high temperature (1000s of degrees Fahrenheit) industrial processes such as aluminum smelting or coke oven gases that show some adverse effects.

So that is one of the ways environmental activists create alarm – by taking advantage of the fact that most people haven't thought about the difference between **hazard** and **risk**. The next two pages contain a list from RealClearScience.com of the every-day items that have a **cancer hazard classification**, meaning that, **under certain exposure circumstances**, they might pose an **actual risk**.

Everything Causes Cancer!

Posted by **Ross Pomeroy** April 8, 2013

Let's just cut to the disquieting chase: pretty much everything in life has been claimed to be linked to cancer. Look at the long list below. You probably deal with at least a few of these supposed carcinogens on a daily basis:

Facebook
Wine
Catching a cold (in childhood)
Antiperspirants
French Fries
Oral Sex
Vitamin E Supplements
Red Food Dyes
Salty Soup
Hair Dyes
Mouthwash
Sun Tan Lotions
Pringles
X-rays
Moisturizers
Cell Phones
Talcum Powder
Red Meat
Alcoholic Beverages
Asbestos
Smoked Salmon
The Sun
Tobacco Products
Chloroform
Formaldehyde
Bubble Tea Tapioca Pearls (Whatever those are...)
Microwave Popcorn Bags
Baby Shampoo
Sugar
Salt
Eggs
Corn
Coffee
Cheese
Butter
Bread
Bacon
Grapefruit
Vegetable Oils
Being Fat
Coca-Cola & Pepsi
Hot Dogs
Taking a Trip to Cancun
Stress
Male Hair-Loss Pills
Anal Sex
Buses (pdf)
Artificial Sweeteners
Cholesterol-lowering Drugs
Bras
Household Cleaning Products
Air Fresheners

Aspirin
Chicken Meat
Health Supplements
Airport Scanners
Milk
Microwave Ovens
Fluoridated Water
Burnt Toast
Brushing your teeth poorly
Marijuana
Modern Life (Yes, life, itself.)

After reading this extensive, though probably not exhaustive, list you may very well feel a slight inclination to live out the remainder of your life in a plastic ball But I would encourage you to repress that urge, as many (but not all) of the supposed carcinogens listed above lack reliable supporting science. Of course, that doesn't stop headline-hungry media and Internet outlets from publishing attention-grabbing stories, no matter how unsubstantiated they may be.

These outlets may not take health reporting seriously, but that doesn't stop cancer from being a serious health problem. The American Cancer Society projects that 580,350 Americans will die of cancer in 2013 alone. The cancer death rate has decreased in the past decades, but it's still far too high. Cancer deserves serious reporting, yet some outlets seem only interested in fear-baiting. This vexing situation irks a great many oncologists.

"Anxiety concerning insidious cancer causation could divert attention from proven means of cancer prevention," noted cancer researcher Bernard Stewart wrot in *The Lancet Oncology* last year. These proven means can be as simple as eating a balanced diet, enjoying alcohol in moderation, exercising, and abstaining from the use of tobacco products.

When it comes to cancer, the media should be focused on providing meaningful and critical coverage, not using the grave disease as a tool to attract anxious readers.

**Note: Living in a plastic ball isn't a surefire way to avoid cancer, as it seems plastics may also contribute to the disease!*

(Special thanks to the *Daily Mail UK* for providing the majority of the cancer scaremongering! If you know of any more carcinogens to add to the list, let me know in the comments below!)

CICI | **Chemical Industry Council of Illinois**

Date: July 25, 2014

To: E. Gene Greable, President – Village of Winnetka

From: Mark Biel, Executive Director, Chemical Industry Council of Illinois

Re: Village of Winnetka Proposal Ban of Refined Tar Sealer (RTS)

Mr. Greable, as requested, here the Refined Tar Sealer (RTS) industry comments on the Village of Winnetka's proposed ban of Refined Tar Sealer:

1) Based on comments made at the July 8 Environmental & Forestry Committee Hearing, it appears that the Village of Winnetka has not tested its stormwater discharge to determine if there are PAHs in the Winnetka discharge.

   At a minimum, an ordinance banning RTS seems premature prior to the Village determining if PAHs are in the stormwater discharge. If PAHs are in the stormwater discharge, it's a relatively simple process to determine if the PAHs are from Refined Tar Sealer (RTS) or other sources of PAHs.

2) The comment was made that the IEPA would look favorably on Winnetka's permit for stormwater discharge if RTS was banned in the village.

   Please note that the IEPA doesn't consider PAHs levels in granting or denying permits for stormwater discharges into Lake Michigan. Also please note that the IEPA has not supported any legislative efforts in the Illinois General Assembly to ban the use of RTS in Illinois. Neither has the Illinois Department of Public Health supported any efforts to ban RTS in Illinois.

   There are many reasons PAH levels in sediments (and discharges to sediments) are not of high concern to agencies such as IEPA, including that the USEPA long ago determined that there is rarely any correlation between PAH concentrations in sediment and sediment toxicity. The reason for this has been found to be that PAHs, which are virtually insoluble in water, are not usually bioavailable.

3) Additionally the comment was made at the hearing that the Illinois Department of Natural Resources (IDNR) was considering a ban of RTS in coastal areas. After conversation today with IDNR, the IDNR staff made it very clear that the Department doesn't have any regulatory authority to ban RTS or any other substance.

4) Here's a brief summary of what the USEPA says about coal tar:

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Springfield
400 W. MONROE, SUITE 205, SPRINGFIELD, IL 62704 • TEL: (217) 522-5805 • FAX: (217) 522-5815
Website: www.cicil.net

- Under the Resource Conservation and Recovery Act (RCRA), the USEPA exempts crude coal tar from coking ovens from listing as a hazardous waste as long as it is recycled or *refined*. This exemption is to encourage recycling, and works because, although *crude* coal tar might contain some extraneous hazardous materials, those are removed in the *refining* process resulting in refined coal tar that does not meet any of the criteria of hazardous waste set up under RCRA by USEPA. Refined coal tar is the product used in manufacturing Refined Tar Sealer (RTS).

- This RCRA exemption has been reinforced by a court case which found that coal tar in the form of Manufactured Gas Plant (MGP) remediation waste does not meet RCRA hazardous waste characteristic criteria. USEPA did not appeal that court finding, but instead issued a letter opinion and an internal memo supporting the court's finding and stating that it is appropriate to dispose of MGP remediation waste (that is, coal tar) in non-hazardous waste landfills. By the way, the court's opinion was written by now-U.S. Supreme Court Justice Ginsburg when she was on the DC Circuit Court, before being nominated to the Supreme Court.

The other top level piece of legislation/regulation is the FDA, which defines coal tar in exactly the same way as industry would. The RTS base material is "further processed" and is a fractional distillate. See attached photograph -- Goeckerman Treatment

Here are the FDA definitions for Coal Tar and Coal Tar's use in FDA Approved Products

> 21 CFR 358.703 (Definitions) (a) Coal tar. The tar used for medicinal purposes that is obtained as a byproduct during the destructive distillation of bituminous coal at temperatures in the range of 900 °C to 1,100 °C. It may be further processed using either extraction with alcohol and suitable dispersing agents and maceration times or fractional distillation with or without the use of suitable organic solvents.
>
> 21 CFR 358.71 (Active Ingredients for dandruff, seborrheic dermatitis, or psoriasis)... Coal tar, 0.5 to 5 percent. When a coal tar solution, derivative, or fraction is used as the source of the coal tar, the labeling shall specify the identity and concentration of the coal tar source used and the concentration of the coal tar present in the final product.

5) While two U.S. Geological Survey (USGS) researchers in Austin, TX claim RTS is a problem, the USGS has not called for banning of the use of RTS.

In addition, after four appeals of USGS FOIA responses by the Pavement Coatings Technology Council (PCTC), which seeks the data underlying claims made by the two USGS researchers in Austin, TX, PCTC was forced to file suit in

U.S. District Court for the District of Columbia on July 16, 2014 for injunctive relief against the USGS because the USGS has failed to even acknowledge, much less respond to, PCTC's four FOIA appeals. (Case No. 14 cv 01200).

It's very frustrating for the RTS industry to be attacked by two government researchers who so far have resisted efforts to turn over their data and have their data analyzed.

6) After reading the Winnetka Environmental & Forestry Committee report on Refined Tar Sealer (RTS), it's clear that the Environment committee didn't talk to anyone who manufactures RTS. While the committee did talk to an RTS applicator about availability of alternatives and price, the committee appears to have made no effort to talk with anyone at Pavement Coatings Technology Council or the three RTS manufacturers in Illinois.

   With the utmost respect, the report is clearly written with a strong bias against RTS. If RTS were as bad as described in the report, I'm sure federal and state regulatory agencies would have taken immediate action to ban the product. They haven't. One reason they haven't is that refined coal tar does not even meet USEPA's criteria to be considered hazardous waste under the Resource Conservation and Recovery Act (RCRA). The USEPA and federal courts (208 F3d 1047 (DC Circ. 2000) have both issued opinions clarifying that coal tar (which is the essential constituent in Manufactured Gas Plant (MGP) remediation waste) is, to quote USEPA:

   > *Therefore, absent the TCLP test, MGP remediation wastes are unlikely to be RCRA hazardous waste under the federal program, and would not be required to meet RCRA requirements, including Land Disposal Restriction requirements. (United States Environmental Protection Agency. Letter to Vectren Corporation, dated October 19, 2000. RCRA Online No. 14491 Available at http://yosemite.epa.gov/osw/rcra.nsf/0c994248c239947e85256d090071175f/161034d3f5e9d3a1852569c900623edb!OpenDocument)*

   Refined coal tar that is the base material used to make RTS pavement sealer has undergone TCLP testing (*Toxicity Characteristic Leaching Procedure testing - The TCLP is designed to determine the mobility of both organic and inorganic analytes present in liquid, solid, and multiphasic wastes*) and, as USEPA predicts, does not meet the RCRA hazardous waste criteria. Different brands of pavement sealcoat emulsion tested at different times in different labs have all passed USEPA's toxicity characteristic test (TCLP), indicating that RTS does not meet the criteria to be a hazardous waste and disposal in non-hazardous waste landfills is appropriate.

7) While true that some big box hardware stores (Home Depot, Lowes) don't sell RTS, interestingly most of these same stores specify RTS use on their own

parking lots. These big box stores realize that when protecting their substantial parking lot investment, RTS is recognized as a far superior product compared to asphalt emulsion.

The big box stores decision to take RTS off the shelf was due to pressure from activists and not because of any health or environment concerns with RTS.

NO HEALTH EFFECTS

- There is no record that PAHs from these pavement sealers have ever caused harm to anyone. Ready-to-use pavement sealers (both refined coal tar and asphalt based) have never been cited for a health concern due to the use of its sealers. Not even the proponents of a ban can show that RTS has ever harmed anyone beyond skin irritation effects experienced by some applicators.

- Air sampling studies showed refined coal tar based sealers pose no inhalation risk to applicators, manufacturers or the general public.

- The U.S. Food and Drug Administration (FDA) has approved coal tar for decades as a base ingredient for skin creams and shampoos that fight certain skin conditions. The FDA would not approve over the counter products to be applied to the skin and scalp if they were harmful. The amount of PAH's produced by these FDA-approved products are as high if not higher than that found in refined tar sealer. Denorex shampoo highlights in their ads that their product contains up to twice as much coal tar as their competitors. http://www.denorex.com/therapeutic-dandruff-shampoo

- The IARC (International Agency for Research on Cancer) has not classified refined tar or refined coal tar based sealers as a human carcinogen. Refined tar sealer is not and has never been classified as a hazardous material by the USEPA.

- In 60 years of use, not one single liability or workers' compensation claim has been made relative to any type of chronic harm caused by RTS. Companies, contractors, and home owners have safely used RTS and have not experienced any adverse effects.

FACTS ON SEALANTS AND POLYCYCLIC AROMATIC HYDROCARBONS (PAHs):

- While coal tar is commonly used in medicinal products, such as dandruff shampoos, psoriasis and eczema treatments, coal tar is also commonly used to seal drinking water pipes as well as sewer and storm water drain pipes as coal tar is insoluble in water and protects the piping from damage related to caustic substances that can build up in piping.

- PAH's are a group of more than 100 chemical compounds that are everywhere in the environment in such diverse sources as: auto exhaust, motor oil, industrial processes, electric power generation, wood and yard waste burning, and even barbeque grilling. Comprehensive mass balance studies of urban harbor sediments have estimated that PAH's from Refined Tar Sealer account for less than one half of a percent (0.4%) of the PAH.

- Studies have consistently found that traffic-related emissions, not runoff from pavement sealed with refined tar-based sealer, are the primary source of all PAHs in the urban environment.

- A focus on just refined tar-based sealants won't reduce the amount of PAHs. Even concrete pavements that do not require sealants do collect PAHs from spills, leaks, abrasion and atmospheric deposition which may be washed into streams during rain events.

ALTERNATIVES NOT EFFECTIVE

- Asphalt emulsions also contain PAH's.

- RTS is chosen over asphalt emulsion as a better raw material based on its ability to prevent the intrusion of gas, oil, and other petroleum products from damaging the pavement, and the very hard film that RTS forms over the pavement, making it very durable.

- Asphalt emulsions are used as a raw material in sealer only as a substitute, in areas where RTS is not available, and has proven to be an inferior substitute. Asphalt emulsion sealers only last a couple of years, only one coat can be applied in a day, and wash out areas are very common. If properly applied, RTS can last two to three times longer than asphalt emulsion sealers.

- Due to seasonal differences between RTS and alternative sealers, businesses will see a 20% reduction in the time in which they can be applied as the application season (weather) for asphalt emulsion is shorter. This is more than a theoretical estimate. Bans in local communities with milder warmer climates than Northern Illinois have demonstrated that a 20% reduction is likely a low estimate.

ENVIRONMENTAL EFFECTS

Banning sealants in the long run will have a much greater impact on the environment and natural resources:

- Pavement life will be decreased dramatically, requiring increased levels of asphalt replacement, overlayments, and total replacements. This will require more crude oil to manufacture the asphalt, more rock extracted from our rock

quarries, more fuel to manufacture asphalt and raw materials, not to mention the performance of this work.

- Most asphalt pavements will need to be replaced within 10 years. Properly maintained RTS sealed pavements have been shown to last for 30 years or more.

- Place a financial burden on homeowners and businesses from the need to reapply asphalt emulsion sealers more often than RTS, not the mention the lack of "curb appeal" which attracts customers to a freshly sealed and well maintained parking lot.

ACTIVISTS FALSE ARGUMENTS

Activists who are campaigning against the use of refined tar-based pavement sealer (RTS) generally make arguments that rely on distortions and discredited interpretations of environmental and health science evidence.

False Argument #1: RTS is the source of a high percentage of compounds known as polycyclic aromatic hydrocarbons (PAHs) in sediments in lakes, streams and storm water retention ponds.

This argument is based on a mathematical model manipulated to falsely identify sealants as the source of PAHs. Results given by the manipulated model have been shown to be inconsistent with other methods (graphical, statistical, mathematical models) commonly used to help identify sources of PAHs. The manipulated model identifies sealant as the main source of PAHs even in locations where sealant is not likely to have been used as well as remote locations with no nearby paved surfaces. When other common methods are used to identify sources of PAHs, little or no contributions from RTS have been found in most locations.

False Argument #2: RTS is a health hazard.

Across the two, three and four generation memories of the many family-owned companies in the RTS business, there are no reports of adverse chronic health effects directly attributable to RTS. Expanding the search for possible health hazards to other products made from refined tar, every day millions of people world-wide use coal tar soaps, shampoos and creams approved for over-the-counter sales to treat skin disorders such as eczema, psoriasis and dandruff. A refined tar product is used to coat the inside surfaces of pipes used to distribute drinking water in many areas, with no demonstrable adverse effects on the water-drinking public. The false argument is that, theoretically, there could be health effects based on the classification of constituent ingredients as possible human carcinogens, which classifications in turn are based on exposure of laboratory animals to high concentrations of individual PAH compounds[1] or on occupational exposure of coke oven workers. There is simply NO evidence that RTS causes cancer.

[1] PAHs are never found as individual compounds in nature and are rarely isolated for commercial purposes. Individual PAH compounds are artificially isolated for laboratory testing. RTS is a mixture of clays, sand and refined tar that itself is a mixture that includes PAHs..

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False Argument #3: RTS pollutes water supplies.

The false argument is that PAHs derived from RTS are a threat to water supplies. Even if RTS were an important source of PAHs found in sediments, neither RTS nor PAHs pose any threat to water supplies because RTS and indeed, PAHs in any form, are virtually insoluble in water. Examples of the virtual absence of PAHs in water can be found in every US state's Clean Water Act Section 303(d) reports, in which reports of PAHs as a cause of impairment of water quality are extremely rare. Every drinking water system in the US is required to analyze and report chemicals found in water distributed to homes – it is exceedingly rare for drinking water suppliers to find PAHs in drinking water supplies.

False Argument #4: RTS is based on a hazardous waste, and banning it is a factor in approval of MS-4 permits.

Neither RTS nor its coal tar base are hazardous wastes because they pass EPA's hazardous waste TCLP test, and so are not subject to Land Disposal Restrictions in federal hazardous waste regulation program. This has been affirmed by federal courts. Measures to control PAHs or coal tars are not factors in approval of MS-4 permits. PCTC has challenged EPA to correct misinformation about RTS on its storm water web site.

False Argument #5: There's an alternative product available, so why not just ban RTS?

Asphalt-based pavement sealers (ABS) are indeed an alternative, but they are not a replacement because ABS does not do the same job. Where both are available, RTS is preferred for most applications. This preference is mostly because RTS is resistant to degradation caused by leaks/spills of petroleum-based products (such as gasoline, jet fuel, motor oil, etcetera), to other corrosive materials and because of longevity. ABS needs to be re-applied more often than RTS – depending on the situation, the longevity of RTS can be years longer than ABS. In addition, RTS is manufactured to a standard which, among other things, means its physicochemical properties are predictable. There have been and continue to be attempts to develop standards for ABS manufacture, but there isn't one at this time. The predictability and performance characteristics of RTS are the prime reasons RTS is specified for many situations.

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Most of the companies involved in the RTS industry are small and medium size businesses – just the sort of businesses that are disadvantaged by the rush to regulation that seems to be popular now. RTS manufacturers and suppliers are good corporate citizens, with well paid, often unionized work forces. Recently, the Pavement Coatings Technology Council held a webinar for sealcoating contractors. Of the 265 industry participants who registered for the webinar, 47% were from companies with 10 or fewer employees. Another 32% were from companies with 11 to 35 employees. This reflects the industry, dominated by small to very small local businesses. Contractors in northern states estimate that using ABS rather than RTS reduces their sealcoating season by, at a minimum, 20%, thereby reducing their income by 20% or more.

PAVEMENT SEALANTS IN THE ENVIRONMENT RESEARCH FUNDED BY PCTC

PCTC has been actively engaged in funding new science projects and reviews of existing information to try to answer the question:

Does pavement sealant pose a threat to human health or the environment?

Some people seem think that businesses are not interested in potential health or environmental impacts of their products. But businesses are collections of people too, with families and friends and deep concerns about health and the environment. For PCTC this has meant a directive to try to answer the question above, as no PCTC member wants to be in a business that causes harm.

The following pages lists published papers and reports funded by PCTC to help answer the question. PCTC's first choice is that work that it funds be submitted for publication to a peer-reviewed science journal, and a number of such articles are included on the list. PCTC has also submitted a number of detailed evaluations of available science to government agencies such as EPA, the US Geological Survey and state agencies. Those submissions are also listed, as are reports prepared by consultants available on PCTC's web site. Links to web sites where those comments and reports are posted are provided in the list.

If you would like to see any of the publications on this list, please contact alehuray@pavementcouncil.org and copies of the papers or reports will be provided.

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Pavement Coatings Technology Council

WWW.PAVEMENTCOUNCIL.ORG

PUBLICATIONS OF SCIENTIFIC STUDIES OF TAR-BASED SEALANTS IN THE ENVIRONMENT SPONSORED BY THE PAVEMENT COATINGS TECHNOLOGY COUNCIL

(REV. JUNE 25, 2014)

Peer Reviewed Papers in Science Journals:

O'Reilly, K., Ahn, S., Pietari, J. and Boehm, P. (2014). Use of Receptor Models to Evaluate Sources of PAHs in Sediments. *Polycyclic Aromatic Compounds*. Awaiting DOI.

O'Reilly, K. T., Pietari, J. and Boehm, P. D. (2014), Parsing pyrogenic polycyclic aromatic hydrocarbons: Forensic chemistry, receptor models, and source control policy. *Integr Environ Assess Manag*, 10:279–285.

O'Reilly, K., Pietari, J. and Boehm, P. (2012). A Forensic Assessment of Coal Tar Sealants as a Source of Polycyclic Aromatic Hydrocarbons in Urban Sediments. *Environmental Forensics,* 13:185-196.

DeMott, R.P., Gauthier, T.D., Wiersema, J.M. and Crenson, G. (2010). PAHs in Austin Sediments after a Ban on Pavement Sealers. *Environmental Forensics*, 11:4, 372-382.

Post-Publication Peer Reviews Published in Science Journals (Including Submitted Reviews & Responses):

Gauthier, T.D. (2014). Comment on "Coal-tar pavement sealant use and polycyclic aromatic hydrocarbon contamination in urban stream sediments." *Physical Geography*. Submitted.

O'Reilly, K. (2014). Published results do not support the author's hypothesis. Letter to the Editor of *Archives of Environmental Contamination and Toxicology*. Submitted.

O'Reilly, K., Pietari, J. and Boehm, P. (2014). Author's Reply to Van Metre and Mahler's Letter to the Editor on "Parsing pyrogenic polycyclic aromatic hydrocarbons: Forensic chemistry, receptor models, and source control policy." . *Integr Environ Assess Manag*. DOI: 10.1002/ieam.1556.

O'Reilly, K., Pietari, J. and Boehm, P. (2014). Author's Reply to Crane's Letter to the Editor on "Parsing pyrogenic polycyclic aromatic hydrocarbons: Forensic chemistry, receptor models, and source control policy." . *Integr Environ Assess Manag*. 10:325–326. DOI:10.1002/ieam.1548

O'Reilly, Kirk (2014). Response to authors' reply on "Coal-tar-based sealcoated pavement: A major PAH source to urban stream sediments" *Environmental Pollution* 191:264-265.

O'Reilly, Kirk (2014). Article Title Misstates the Role of Pavement Sealers. Letter to the Editor of *Environmental Pollution* 191:260-261.

Magee, Brian and Janet Keating-Connolly (2014). Comment on "Cancer Risk from Incidental Ingestion Exposures to PAHs Associated with Coal-Tar-Sealed Pavement". *Environmental Science & Technology*, *48* (1), pp 868–869.

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O'Reilly, K., Pietari, J. and Boehm, P. (2011). Comment on "PAHs Underfoot: Contaminated Dust from Coal-Tar Sealcoated Pavement is Widespread in the U.S." *Environ. Sci. Technol.*, 2011, *45* (7), pp 3185–3186

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KOPPERS INDUSTRIES, INC.

1991

Using Refined Coal Tar Emulsions Safely

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ABSTRACT

Occupational health issues involving sealcoating with refined coal tar emulsions are discussed including the results of air quality studies conducted during sealcoating, emulsion manufacturing and cure out. All data confirm that refined coal tar usage complies with health and safety regulations.

ACKNOWLEDGEMENT

Koppers Industries wishes to gratefully acknowledge the participation of Gem-Seal, Inc., Tampa, FL; Neyra Industries, Inc., Cincinnati, OH; and SealMaster, Inc., Sandusky OH.

Technical Assistance provided by Koppers Industries, Inc. employees Mr. James E. McFadden, Manager, Quality Control, Mr. Leo C. Whiteford and Ms. Mary Ann Deem was substantial and invaluable toward completion of this project.

INTRODUCTION

In response to continuing concerns from property owners, emulsion manufacturers and sealcoat contractors with regard to the potential for adverse effects of exposure to coal tar as well as asphalt products on health and the environment and coupled with a dearth of airborne data on pavement sealer manufacture/application, a series of field as well as laboratory studies were undertaken by Koppers Industries.

Koppers Industries, Inc. is a major distiller of crude coal tar into a variety of products including refined tars utilized in pavement maintenance and, as such, was positioned to undertake the necessary testing.

Crude coal tar is a by-product of making coke for the steel and foundry industries and constitutes a primary feedstock to the coal tar refining industry. Coal tars have been processed in the United States since Koppers Company completed the first by-product coke oven around 1912.

Crude coal tar is comprised of a complex mixture of naturally occurring compounds which are separated in the tar distillation plant into several fractions including refined tars, pitches, creosote and chemical oils. These fractions in turn have a multitude of end uses ranging from consumer products and industrial chemicals to construction materials. Industries utilizing coal tar derived products include wood treating, aluminum, steel, refractory, chemicals, protective coatings, reinforced plastics, roofing and road paving.

SCOPE OF STUDY

Study objectives included (1) characterizing any airborne emissions that might result from sealer manufacture, application and cure out, and (2) evaluating the regulatory status of refined coal tar sealer with respect to health and safety issues.

Air sampling was conducted during hand spray, squeegee machine and drag box sealer applications as well as batch milling utilizing a high speed shear mill, retail pail filling and bulk loading under what were considered representative operating and environmental conditions. In addition, emissions from the surface of sealed pavement immediately following sealer application were evaluated. Airborne emissions for all activities were characterized for those compounds listed in Table 1.

Since no specific Occupational Safety and Health Administration (OSHA) air standard exists for refined tar, the coal tar pitch volatiles (CTPVs) Standard as the benzene soluble fraction of collected dusts, fumes and mists has historically been employed to evaluate coal tar based products including refined tars. CTPVs (as benzene solubles) is utilized as an indicator of polynuclear aromatic hydrocarbons (PNAHs) where PNAHs are considered cancer causing compounds capable of producing skin tumors. Because many other non-PNAHs are soluble in benzene (i.e., aliphatics, resins, polymers), a CTPVs result can be misleading. To address this issue, selected samples were subjected to PNAH analyses where the CTPVs result approached or exceeded 0.1 milligram.

Table 1. AIR SAMPLE ANALYSES

COMPONENT	OSHA(1) Permissible Exposure Limit
Benzene	1.0 ppm(2)
Toluene	100 ppm(2)
Xylenes	100 ppm(2)
Cresols	5.0 ppm(2)
Phenol	5.0 ppm(2)
Naphthalene	10 ppm(2)
Coal Tar Pitch Volatiles (CTPVs)	0.2 mg/m3(3)
Polynuclear Aromatic Hydrocarbons (PNAHs)	where CTPVs approached or exceeded 0.1 milligram

(1) Occupational Safety and Health Administration.
(2) Parts of contaminant per million parts of air.
(3) Milligrams of benzene soluble particulate (including dust, fumes and mists) per cubic meter of air sampled.

Fifteen (15) PNAHs were evaluated using OSHA Analytical Method Number 58. These results serve as a true indicator of PNAH content and indirectly carcinogenicity. The 15 PNAHs were not arbitrarily selected, but represent those utilized by OSHA as an index of carcinogenicity.

A summary of study conditions as well as those sealer activities surveyed is provided in Table 2.

Table 2. STUDY CONDITIONS SUMMARY

Sealer Activities	Avg. Volume (gallons)	Avg. Area (sq. yds.)	# Samples	Ambient Temp. (°F)		Relative Humidity (%)	
				Avg.	Max.	Avg.	Max.
Hand Spray	1,300	9,300	12	84	94	82	95
Drag Box	1,500	10,000	4	82	94	85	89
Squeegee Machine	1,700	6,700	4	86	98	81	85
Pail Filling	3,000	603 pails	3	104[1]		67	82
Truck Loading	11,500	2 shifts	4	125-133[2]		67	82
Emulsion Manufacture (high shear batch mill)	20,200	15 batches	7	88	102	58	80
				230-240[3]			
Sealed Pavement - Head Space Tests		2 days	2	99-104[4]		81	85
Sealed Pavement - Fugitive Tests		2 days	2	114-118[5]		81	85

(1) Sealer tank filling temperature.
(2) Federal Material (RP355 E) loading temperature.
(3) Refined Tar (RT-12) storage tank temperature.
(4) Maximum enclosure temperature.
(5) Maximum pavement temperature.

It should be pointed out that all data represent the use of sealer emulsions formulated with refined coal tar meeting ASTM D 490 Standard Specification for Road Tars - Grade RT-12 as well as Federal Material RP355 E requirements. While formulations varied depending on job specifications, the refined tar content of sealer emulsions involved in the discussed studies was judged to be representative. Bulk samples of Federal Material and "as applied" sealer were collected in conjunction with each survey and revealed refined tar contents for Federal Material and "as applied" sealer ranging from 29-37 wt. % and 12-17 wt. % respectively.

AIR SAMPLE COLLECTION/ANALYSES

Air samples were collected and analyzed in accordance with Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) procedures and methods. The various collection media utilized were placed in the breathing zones of workers (see Figure 1) to approximate inhalation exposure potentials.

Figure 1. Air Sampling Media — Inhalation Exposure Assessment

Similarly, air samplers were placed directly on the surface of sealed pavement within 15 minutes of sealer application to evaluate head space and fugitive emissions where air samplers were located inside a 2.5 cubic foot enclosure (head space emissions) effectively covering a 2 sq. ft. area of sealed pavement (see Figure 2) as well as in an unshielded (fugitive emissions) configuration (see Figure 3).

Figure 2. Head Space Test Configuration

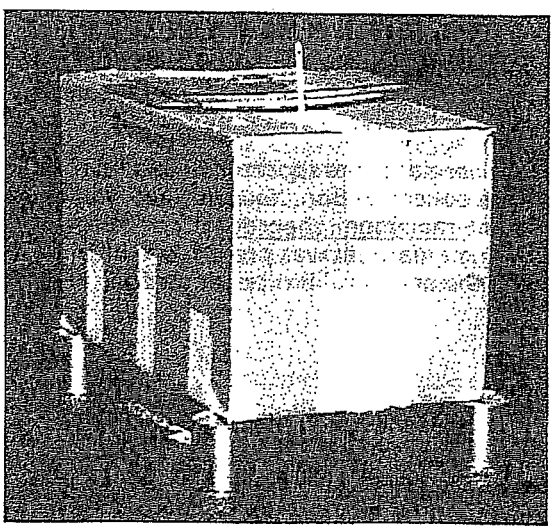
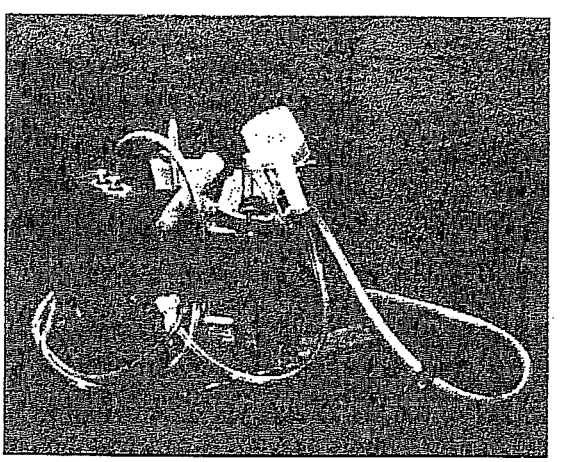


Figure 3. Fugitive Emission Test Configuration



Ambient air was drawn through the various collection media at predetermined flow rates via battery-powered portable sampling pumps.

All analytical work was contracted to an American Industrial Hygiene Association (AIHA) accredited laboratory.

RESULTS

General

Airborne concentrations of the various compounds tested were below the applicable OSHA Permissible Exposure Limits (PELs) in all cases. Most data were below the Analytical Limit of Detection and reported as the sample volume adjusted limit of detection for the analytical method employed. All data represent a full day of activity where sample durations generally ranged between 7-10 hours. This meets the OSHA sample duration requirements to determine compliance and assess exposure potentials.

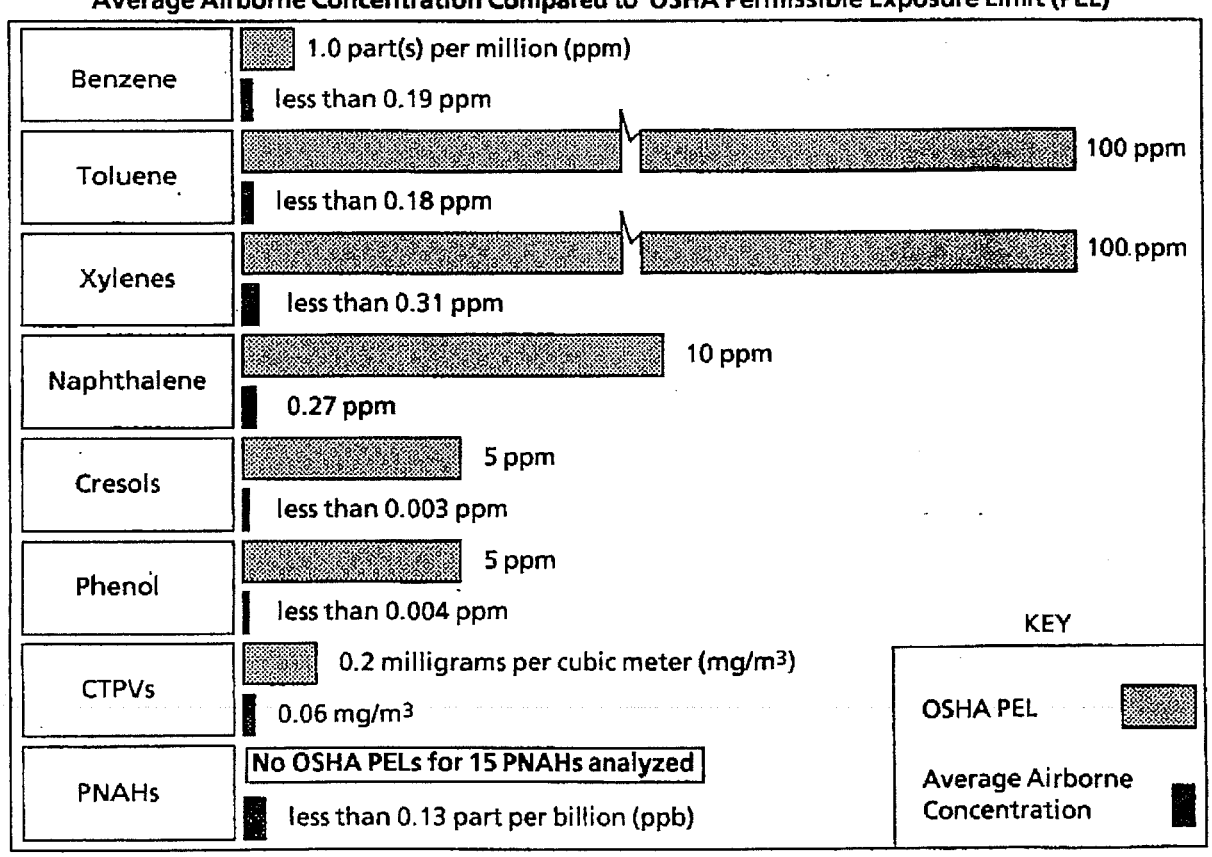
Where data are reported as less than a particular concentration, the involved values represent maximum theoretical concentrations where no material was present on the air sample at the analytical limit of detection.

Hand Spray Application

Airborne levels of volatile organics (benzene, toluene, xylenes and naphthalene) and semivolatile organics (cresols and phenol) were below detectable limits in all cases. CTPVs were detected on roughly 70% of the samples. However, the average concentration of those detectable levels was 0.07 mg/m^3 and the overall average for all samples including results below the limit of detection was 0.06 mg/m^3 where the OSHA PEL is 0.2 mg/m^3. While CTPVs levels were detectable, all data were well below the OSHA PEL. Analysis for 15 PNAHs was undertaken on the highest CTPVs samples (i.e., minimum of 0.1 milligram benzene soluble material). The resulting concentrations were below the analytical limits of detection (0.1-0.2 part per billion) for all 15 polynuclear aromatics.

Field survey air monitoring data are summarized in Figure 4.

Figure 4. HAND SPRAY APPLICATION MONITORING RESULTS
Average Airborne Concentration Compared to OSHA Permissible Exposure Limit (PEL)



Drag Box and Squeegee Machine Application

All airborne concentrations of volatile and semivolatile organics as well as CTPVs were below the analytical limits of detection.

PNAH analyses were not undertaken due to less than detectable CTPVs results (i.e., low levels of benzene soluble material collected on filter samples). Because the levels of benzene solubles (i.e., CTPVs) were generally at or below the detection limit (i.e., 0.02-0.03 milligram), characterization for individual PNAHs was not feasible.

Field survey air monitoring data are summarized in Figures 5 and 6.

Figure 5. DRAG BOX MONITORING RESULTS
Average Airborne Concentration Compared to OSHA Permissible Exposure Limit (PEL)

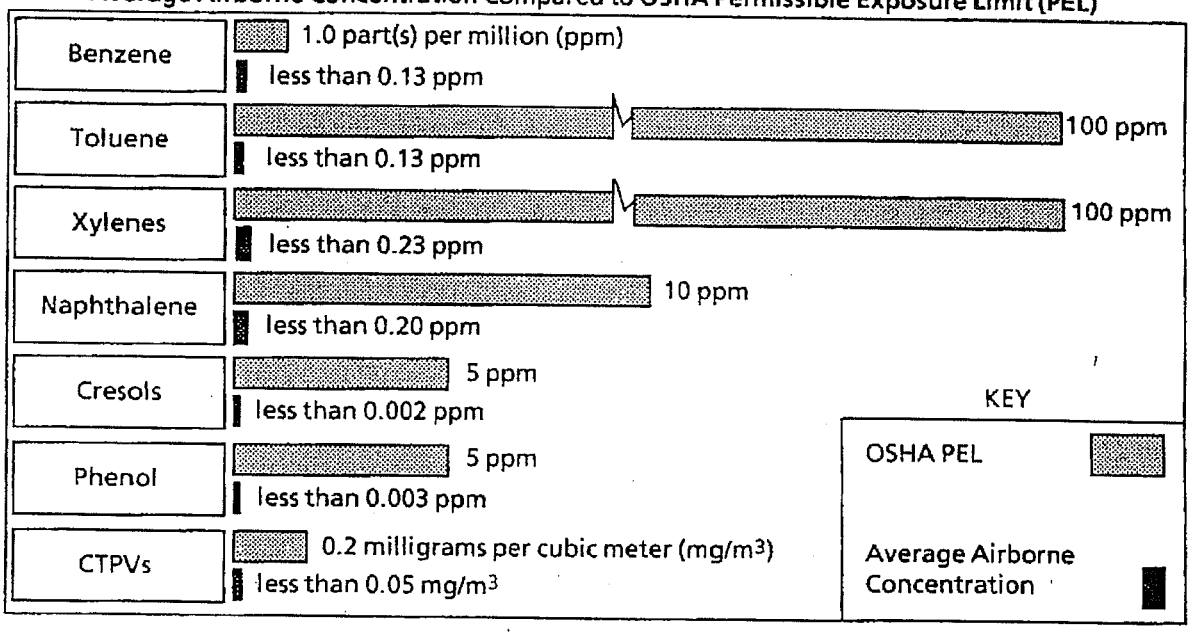
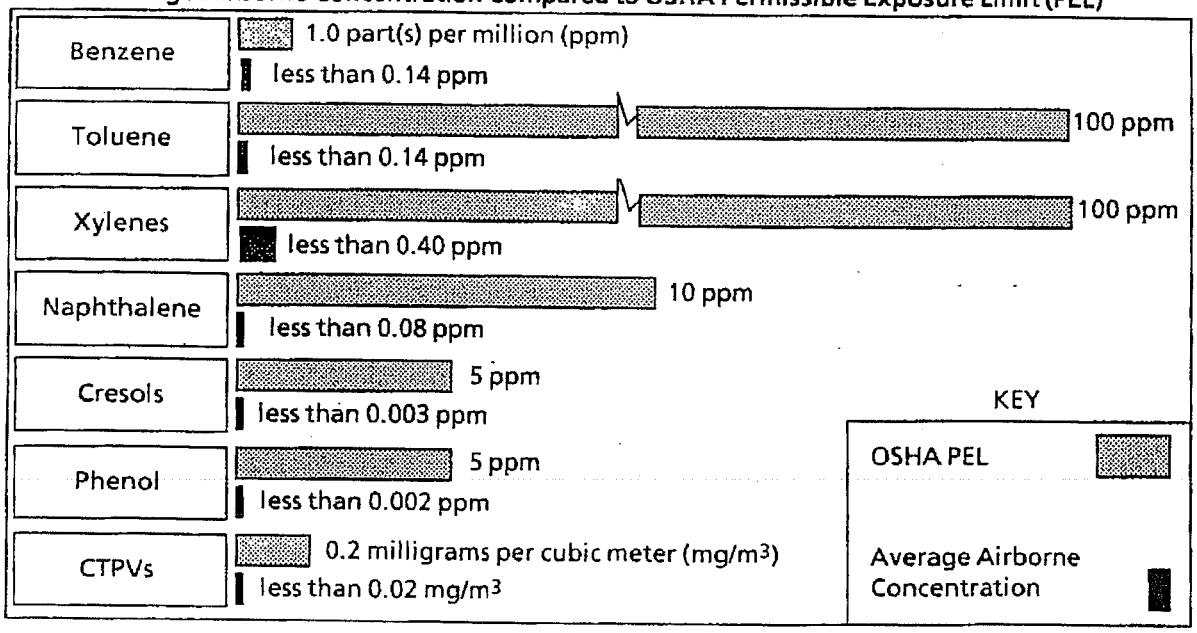


Figure 6. SQUEEGEE MACHINE MONITORING RESULTS
Average Airborne Concentration Compared to OSHA Permissible Exposure Limit (PEL)



Pail Filling and Truck Loading

With the exception of two benzene results (0.15 ppm - during pail filling) and (0.1 ppm - during truck loading), all airborne data for volatile and semivolatile organics as well as CTPVs were at or below the analytical limits of detection. PNAH analyses were not undertaken due to negligible CTPVs results (i.e., low levels of benzene soluble material collected on filter samples). Because the levels of benzene solubles (i.e., CTPVs) were generally at or below the detection limit (i.e., 0.02-0.03 milligram), characterization for individual PNAHs was not feasible.

The two detectable benzene levels were less than 20% of the permissible limit and were not corroborated by area sample results obtained above the pail filling and bulk loading stations.

All area samples (pail filling station and bulk loading platform) were nondetectable for benzene where these area samples would be expected to represent worst-case conditions.

Because the personal samples in question were collected on employees with access to other areas of the plant where solvents and various hydrocarbon additives were being handled/repackaged as part of other coating systems, it is postulated that benzene most likely was present as a trace contaminant in a raw material(s) utilized for coatings other than pavement sealer.

All other data, including application results, support the contention of a non-tar and non-pavement sealer trace source of benzene.

Field survey air monitoring data are summarized in Figures 7 & 8.

Figure 7. PAIL FILLING MONITORING RESULTS
Average Airborne Concentration Compared to OSHA Permissible Exposure Limit (PEL)

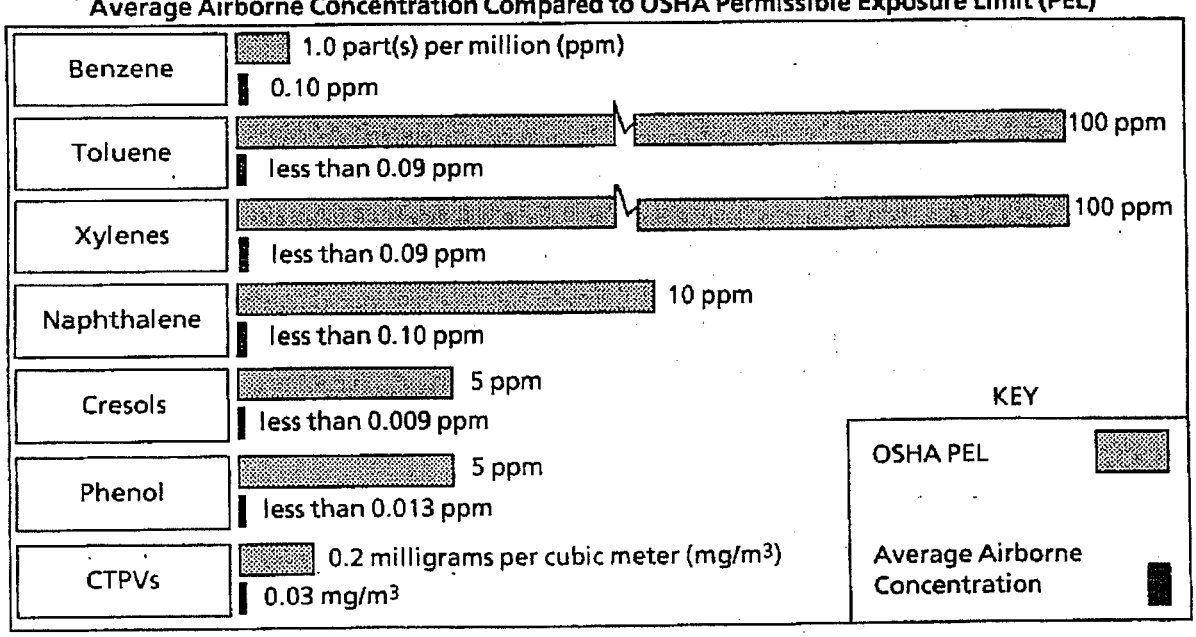
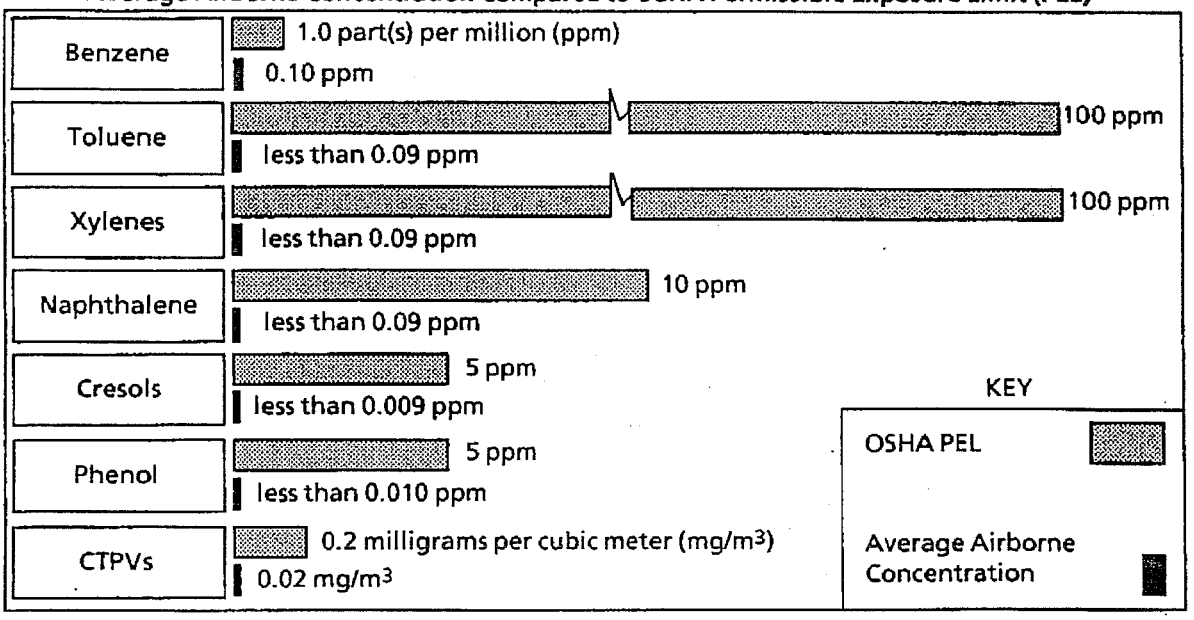


Figure 8. TRUCK LOADING MONITORING RESULTS
Average Airborne Concentration Compared to OSHA Permissible Exposure Limit (PEL)



Emulsion Manufacture (high shear batch mill)

Seventy-five percent (75%) of volatile organic samples were below the analytical limits of detection. Detectable values were reported for benzene, toluene, xylenes and naphthalene ranging from 0.3% to 1.0% of the permissible levels and were not corroborated by area sample results obtained above the batch mill. All area (batch mill) samples were nondetectable for the involved organics where these area samples would be expected to represent worst-case conditions. Given the proximity and simultaneous operation of other coating and patching product manufacturing equipment to the batch emulsion mill, where these other products involved solvents and various hydrocarbon additives, it is felt that the detected volatile organics more than likely originated from raw materials utilized for these aligned products and not pavement sealer. All airborne data, including application results, support the contention of a non-tar and non-pavement sealer source of volatile organics.

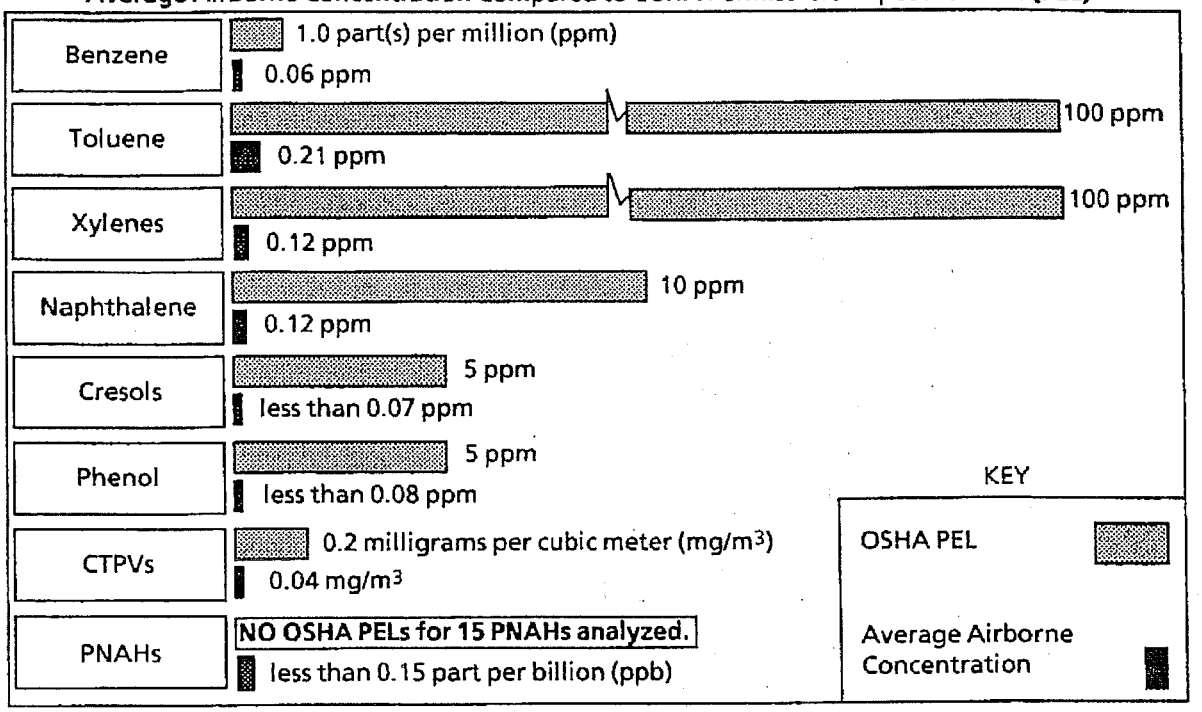
All airborne levels of semivolatile organics were below detectable levels and well below the OSHA PELs.

CTPVs were detected on 70% of the samples. The average concentration of those detectable levels was 0.05 mg/m^3 and the overall average for all samples including results below the limit of detection was 0.04 mg/m^3 where the OSHA PEL is 0.2 mg/m^3. While detectable levels of CTPVs were reported, all concentrations were well below the OSHA PEL.

PNAH analyses were undertaken on the highest CTPVs samples (i.e., minimum of 0.1 milligram benzene soluble material). The resulting concentrations were below the average analytical limits of detection (0.15 part per billion) for all 15 polynuclear aromatics.

Field survey air monitoring data are summarized in Figure 9.

Figure 9. EMULSION MANUFACTURE (HIGH SHEAR BATCH MILL) MONITORING RESULTS Average Airborne Concentration Compared to OSHA Permissible Exposure Limit (PEL)



Sealed Pavement Emissions

Head Space Emissions

With the exception of naphthalene, all airborne data for volatile and semivolatile organics were at or below the analytical limits of detection.

Detectable naphthalene levels were less than 2% of the permissible limit where the average concentration was 0.12 ppm compared to the OSHA PEL of 10 ppm.

CTPVs were present at roughly the limit of detection where the average concentration was 0.03 mg/m^3 and the OSHA PEL is 0.2 mg/m^3. While detectable levels of CTPVs were reported, concentrations were well below the OSHA PEL. PNAH analyses were not undertaken due to negligible CTPVs results (i.e., low levels of benzene soluble material collected on filter samples). Because the levels of benzene solubles (i.e.,CTPVs) were generally at the detection limit (i.e., 0.02-0.03 milligram), characterization for individual PNAHs was not feasible.

Field survey air monitoring data are summarized in Figure 10.

Fugitive Emissions

With the exception of naphthalene, all airborne data for volatile and semivolatile organics as well as CTPVs were at or below the analytical limits of detection.

Detectable naphthalene levels were less than 2% of the permissible limit where the average concentration was 0.12 ppm compared to the OSHA PEL of 10 ppm. PNAH analyses were not undertaken due to negligible CTPVs results (i.e., low levels of benzene soluble material collected on filter samples). Because the levels of benzene solubles (i.e., CTPVs) were below the detection limit (i.e., 0.02-0.03 milligram), characterization for individual PNAHs was not feasible.

Field survey air monitoring data are summarized in Figure 11.

Figure 10. SEALED PAVEMENT MONITORING RESULTS - HEAD SPACE EMISSIONS
Average Airborne Concentration Compared to OSHA Permissible Exposure Limit (PEL)

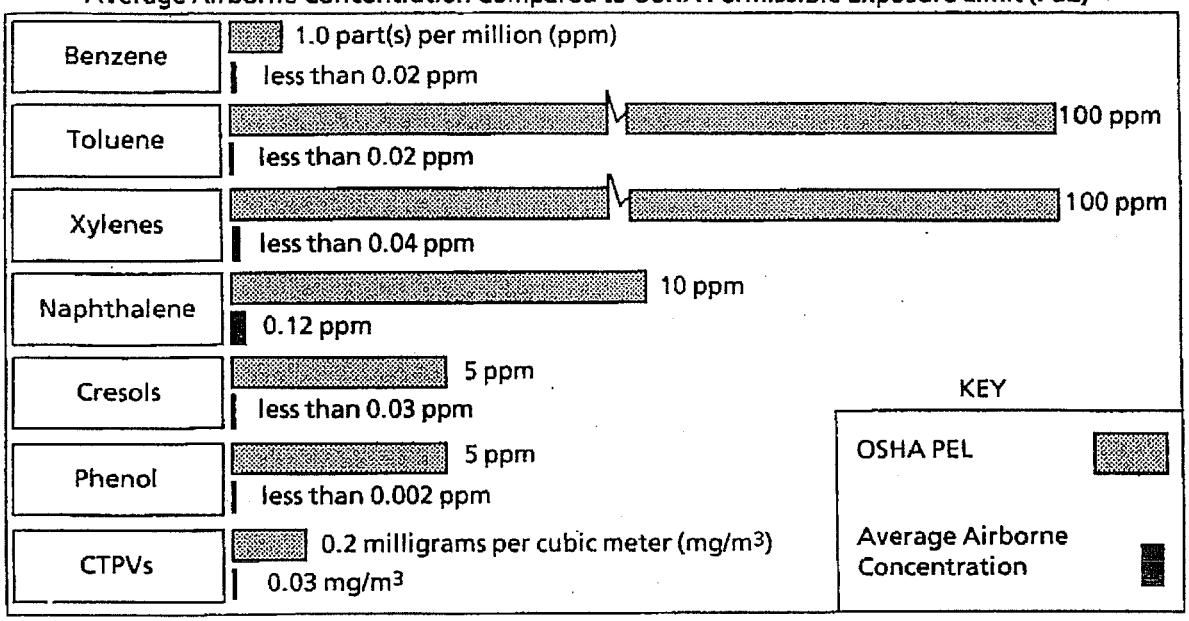
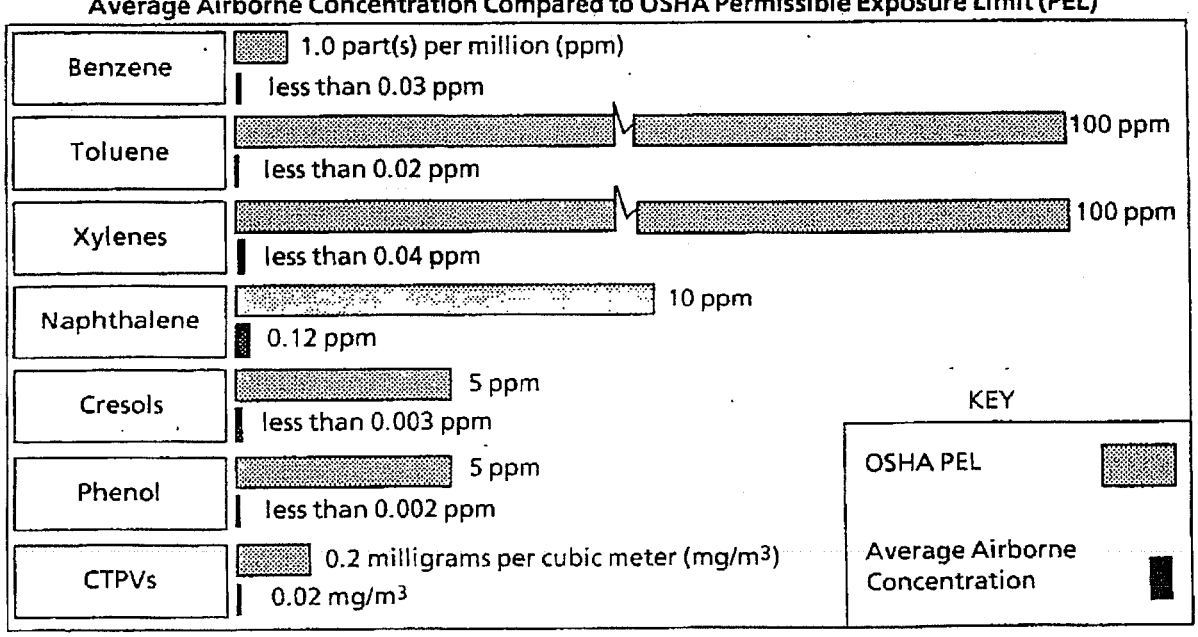


Figure 11. SEALED PAVEMENT MONITORING RESULTS - FUGITIVE EMISSIONS
Average Airborne Concentration Compared to OSHA Permissible Exposure Limit (PEL)



CONCLUSIONS

Air monitoring data collected under representative field conditions involving a variety of refined coal tar sealer application and handling scenarios indicate emissions during sealer application and manufacture are negligible and well below occupational health exposure limits. Similarly, emissions from sealed pavement during cure out are negligible and of no health consequence for applicators or the general public, including pedestrians and property owners.

Refined coal tar (Grade RT-12) as well as refined coal tar emulsions will continue to be available and are not the subject of any regulatory reviews or bans.

Like most industrial chemicals, coal tar has potentially hazardous properties. These potential hazards are well known and can be controlled by following some simple work practices and using good personal hygiene. Refined coal tar sealer can be used safely by following these simple rules:

- Read the manufacturer's Material Safety Data Sheet and follow the recommendations.
- Avoid prolonged direct contact with skin and eyes. If refined tar or sealer does get on your skin or saturates work clothing, the affected garments should be removed and involved skin areas washed with soap or waterless cleaners.
- Full-length clothing should be worn at all times (i.e., long-sleeved shirts buttoned over the glove cuff, long pants with close fitting cuffs extending below the top of work boots).
- Chemical resistant or liquid repellent gloves should be worn. Cloth gloves will absorb sealer.
- For highly sensitive individuals or where there is the possibility of skin contact and exposure to sunlight, a protective cream formulated for coal tar products or a general purpose protective cream applied in conjunction with a No. 15 sun lotion should be used.

GLOSSARY OF TERMS

American Industrial Hygiene Association — Professional organization charged with ensuring all aspects of occupational health evaluation are conducted in a scientific, ethical and professional manner.

Analytical Limit of Detection — The smallest amount of a substance that can be determined by a specific analytical method. When a material cannot be detected at this lower limit, values are reported as less than (<) the limit of detection divided by the air sample volume or what is called the volume-adjusted limit of detection. Values reported in this manner should be considered maximum theoretical concentrations and representative of a worst-case value.

ASTM — American Society for Testing and Materials; a scientific and technical organization for the development of standards on characteristics and performance of materials, products, systems, and services.

CTPVs — Coal tar pitch volatiles; a measure of dusts, fumes, mists that are soluble in benzene (i.e., PNAHs) and an index of carcinogenicity. Historically used to evaluate exposure to coke oven emissions, now applied to all coal tar-derived products.

Distillation — A separation process that consists of driving vapors from a hydrocarbon solution by heating, then condensing to a liquid product. Is used for purification and/or fractionation.

Material Safety Data Sheet (MSDS) — A summary document required by law for all chemicals. Provides health, safety and environmental information as well as physical properties.

mg — milligram; a metric unit of weight, in this case, the amount of a material trapped on a specific collection media. There are 1,000 milligrams in one gram (g) of a substance.

m^3 — cubic meter; a metric unit of volume, in this case the volume of air passed through a specific collection media. The volume of air contained in an enclosed space roughly 40 inches on all sides.

mg/m^3 — Milligrams per cubic meter; a unit for measuring concentrations of particulates or gases in the air [a weight (in milligrams of contaminant) per unit of volume (in cubic meters of air sampled)].

NIOSH — National Institute for Occupational Safety and Health of the Public Health Service, U. S. Department of Health and Human Services (DHHS); federal agency which, in addition to other activities, tests and certifies respiratory protective devices, air sampling and analytical methods/procedures, recommends occupational exposure limits for various substances and assists OSHA in occupational safety and health investigations and research.

OSHA — Occupational Safety and Health Administration of the U. S. Department of Labor; a federal agency with safety and health regulatory and enforcement authority for most of U. S. industry and business.

PEL — Permissible exposure limit; an exposure limit established by OSHA's regulatory authority. Airborne concentration at which workers would not experience health effects.

PNAHs — Polynuclear Aromatic Hydrocarbons; organic compounds usually composed of three or more carbon rings. It is believed that some of these compounds are capable of causing skin tumor formation upon repeated and prolonged exposure.

ppb — Parts per billion; a unit for measuring the concentration of a gas or vapor in air; parts (by volume) of the gas or vapor in a billion parts of air. Equal to one inch in 16,000 miles or one second in 32 years.

ppm — Parts per million; a unit for measuring the concentration of a gas or vapor in air; parts (by volume) of a gas or vapor in a million parts of air. Equal to one inch in 16 miles or one minute in two years.

Protective Cream — A protective skin cream provides an invisible, flexible protection for the hands from soils, solvents, dusts, powders, oils, greases, paints, epoxies, resins, inks and irritants. It can be easily removed by washing with any cleansing product.

Semivolatile Organics — For purpose of this study, semivolatile organics refers to cresols and phenols.

Volatile Organics — For purposes of this study, volatile organics refers to benzene, toluene, xylenes and naphthalene.

GEMSEAL
Toxicity Characteristic Leaching Procedure (TCLP) Results

COMPONENTS	REGULATORY LIMITS (mg/L)[1]	REFINED TAR K-364 (mg/L)[1]	GEMSEAL #1[2] FEDERAL C.T.E. (mg/L)[1]
METALS (6010, 7470)			
Arsenic	5.0	<0.20	<1.0
Barium	100.0	<0.10	<1.0
Cadmium	1.0	<0.10	<0.05
Chromium	5.0	<0.10	<1.0
Lead	5.0	<0.10	<1.0
Mercury	0.2	<0.001	<0.002
Selenium	1.0	<0.2	<0.2
Silver	5.0	<0.5	<1.0
VOLATILE ORGANICS (8240)			
Benzene	0.5	0.007	<0.05
Carbon tetrachloride	0.5	<0.005	<0.05
Chlorobenzene	100.0	<0.005	<0.05
Chloroform	6.0	<0.005	<0.05
1,1-Dichloroethene	0.7	<0.005	<0.05
1,2-Dichloroethane	0.5	<0.005	<0.05
Methyl ethyl ketone	200.0	<0.01	<0.10
Tetrachloroethene	0.7	<0.005	<0.05
Trichloroethene	0.5	<0.005	<0.05
Vinyl chloride	0.2	<0.01	<0.10
SEMIVOLATILE ORGANICS (8240)			
Total cresol (non-specific)	200.0	<0.025	0.16
1,4-Dichlorobenzene	7.5	<0.025	<0.025
2,4-Dinitrotoluene	0.13	<0.025	<0.025
Hexachlorobenzene	0.13	<0.025	<0.025
Hexachlorobutadiene	0.5	<0.025	<0.025
Hexachloroethane	3.0	<0.025	<0.025
Nitrobenzene	2.0	<0.025	0.07
Pentachlorophenol	100.0	<0.13	<0.13
Pyridine	5.0	<0.025	0.025
2,4,5-Trichlorophenol	400.0	<0.025	<0.025
2,4,6-Trichlorophenol	2.0	<0.025	<0.025
HERBICIDES (8150)			
2,4-D	10.0	<0.01	<0.01
2,4,5-TP (silvex)	1.0	<0.1	<0.1
PESTICIDES (8080)			
Chlordane	0.03	<0.01	<0.01
Endrin	0.02	<0.001	<0.001
Heptachlor (and its epoxide)	0.008	<0.0005	<0.0005
Lindane	0.4	<0.0005	<0.0005
Methoxychlor	10.0	<0.005	<0.005
Toxaphene	0.5	<0.01	<0.01

Analytical Procedures: A zero headspace extraction (volatiles) was performed in addition to an oil and non-aqueous extraction procedure for nonvolatiles analyses. All extractions were performed via the TCLP Procedure 1311 described in the Federal Register, Vol. 55, No. 61, 3-29-90, pp 11798-11877.

Analytical Method Reference: SW-846, 3rd Edition, 40 CFR, Part 261.

NOTE: All less than values represent the quantitation limit for the method/analytical equipment employed where the involved constituent was not found to be present.

(1) Milligrams per liter or equivalently parts per million.

(2) Federal C.T.E., TANK #2, Tampa Facility.

10300 Pulaski Highway
White Marsh, MD 21162

November 3, 2009

To Whom It May Concern:

This is to certify that Gem Seal Fed. Spec. pavement sealer contains **less than 50 grams per liter VOC**, as determined in accordance with California Air Resources Board (CARB) rules for Volatile Organic Compounds (VOC) of Architectural and Industrial Maintenance (AIM) Coatings, revised as of 6/4/08 to become effective 1/1/10. Gem Seal Fed. Spec. pavement sealer meets the criteria defined according to the most restrictive coating category definition [Driveway Sealers] of this regulation, which lists a corresponding VOC limit of 50 grams per liter maximum.

If you have any questions or need further information, please do not hesitate to contact me.

Respectfully submitted,

Geoff Crenson
Technical Manager
Pavement Maintenance Division

ATTACHMENT #4

COAL TAR FREE AMERICA:

INFORMATION SUBMITTAL

Megan Pierce

To: Thomas Ennis
Subject: RE: Winnetka- EFC

Chuck:

Not sure what's up with the links so I will re-paste the response with the links shown in text. This will enable anyone to copy and paste this into a browser if the hot links aren't working. While it kind of looks like I am using myself as a reference a bit, I think you'll find that many of these contain additional source links.

Concerning the Framework A, B, C questions:

Coal Tar Sealers:

A. Is it toxic to humans or the environment? yes, carcinogenic, teratogenic (birth defects), toxic, and mutagenic

1. Carcinogenic

Coal-tars and Derived products. 1985 International Agency for Research on Cancer (IARC) vol 35, 83 p. (http://www.inchem.org/documents/iarc/vol35/coaltars.html)

This landmark document describes the carcinogenic properties of coal tars and coal-tar pitches, and finds that there is sufficient evidence that coal-tar pitches are carcinogenic in humans.

Williams, E. S.; Mahler, B. J.; Van Metre, P. C. Coal-tar pavement sealants might substantially increase children's PAH exposures. (http://www.sciencedirect.com/science/article/pii/S0269749112000279) Environ. Pollut. 2012.

This "New Initiatives" article in Environmental Pollution estimates that, although dietary ingestion has long been thought to be the primary route of human exposure to polycyclic aromatic hydrocarbons (PAHs), for children 3-5 years of age living in residences adjacent to parking lots with coal-tar-based sealcoat, non-dietary ingestion of PAHs (i.e., ingestion of house dust) is about 2.5 times that of dietary ingestion.

Williams, E. S.; Polycyclic Aromatic Hydrocarbons and Human Health http://www.youtube.com/watch?v=qlETVVBSKK4&feature=share&list=PL092256775CBEBD8E. University of Connecticut PAH Seminar, November 2011.
This is a video summary of Dr. Williams' findings.

For the first time, a toxicologist publicly presented the probable risks to children exposed to dust tracked into homes from coal tar pavement sealants. An excess risk of 1 in 10,000 was estimated. Federal law deems this risk "unacceptable" and is "sufficient basis" for action. The professor from Baylor University, Dr. Spencer Williams, stated additional studies are warranted.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, Public Health Service Agency for Toxic Substances and Disease Registry, Division of Health Assessment and Consultation: Health Consultation for Leander Independent School District (http://www.atsdr.cdc.gov/hac/pha/LeanderIndependentSchoolDistrict/LeanderIndependentSchoolDistrict%20HC%202-13-2008.pdf), Proposed Elementary School #19, (Grandview Hills Elementary), Austin, Travis County, Texas, EPA FACILITY ID: TXN000606777, February 13, 2008.

For years it was hoped that the federal government toxicologists would just look at the safety of children exposed to coal tar sealants. A few years ago it was discovered that they already had, but it was coincidental. A school district outside of Austin, Texas (Leander) was looking to build a new elementary school. They purchased a property that met their needs except that it had been a chemical research facility. When parents found out, many were very upset. So upset that they got the attention of their elected officials, who in turn brought in the feds (more specifically the Agency for Toxic Substances and Disease Registry ATSDR, who routinely does this kind of work).

They tested the soil and analyzed the risks. They found relatively high levels (69 mg/kg, but nothing near the highest in pavement dust by the USGS: 3200 mg/kg) of polycyclic aromatic hydrocarbons (PAHs) in the soil near where there were parking lots and the source was determined to be coal tar pavement sealants. The levels were sufficient to increase cancer risk in a low to moderate range if it remained at the proposed site. As a result soils were removed under the description of "remediaton."

2. teratogenic (birth defects)

Effect of Prenatal Exposure to Airborne Polycyclic Aromatic Hydrocarbons on Neurodevelopment in the First 3 Years of Life among Inner-City Children (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1551985/) , Environ Health Perspect. 2006 August.

3. toxic

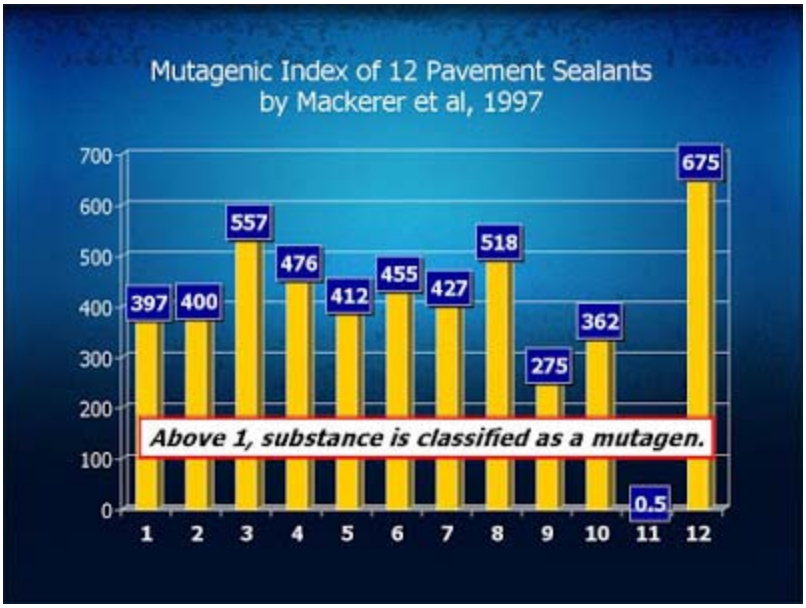
Coal-tar based pavement sealant toxicity to freshwater macroinvertebrates (http://www.sciencedirect.com/science/article/pii/S0269749109005375). Bryer, P.J., Scoggins, M., and McClintock, N.L., 2009. Environmental Pollution, v. 158, no. 5, p. 1932-1937.

This scientific journal article reports that exposure to sediment contaminated with coal-tar-based sealcoat resulted in decreased abundance and richness of freshwater macroinvertebrates, an important element in the aquatic food chain.

4. mutagenic

Comparative carcinogenic and mutagenic activity of coal tar and petroleum asphalt paints used in potable water supply systems. http://www.ncbi.nlm.nih.gov/pubmed/6201525

Mackerer, C. R. et al; Mutagenicity and PAC Content of Seal Coatings for Asphalt Pavement. 16th International Conference on Polycyclic Aromatic Compounds, November 1997.



We continue to hear some say that coal tar sealants have the toxic ingredients refined out (generally polycyclic aromatic hydrocarbons, PAH). This in spite of the laboratory levels of showing extremely high concentrations.

A few years ago, I came across this research that got little attention when presented back in 1997. It pre-dates any of the current understanding of the problem of coal tar sealants. The lead author is the retired head of the Mobil Corporation's research laboratory. He developed an index to rate the mutagenicity of chemical solutions called the Ames Index. It has been used on other coal or petroleum products as well.

Dr. Mackerer decided to do this study after seeing some college students sealing his neighborhood's driveways. He wondered just how toxic the sealants are. So he went to a hardware store and bought 12 separate products. As the above graph shows, anything above 1.0 is considered a mutagen. The coal tar sealants are an average of about 450! Dr. Mackerer said that while the absolute number can go higher, after a few hundred the real mutagenicity is maxed out .

The only problem with this is that it has never been published, but is only a collection of slides summarizing the team's work.

B. Is it found at concentrations that can have an effect?.

yes, standard effects concentration is 23 ppm and the product can be 70,000 ppm http://pubs.usgs.gov/fs/2011/3010/pdf/fs2011-3010.pdf

Does product type really matter? PAH concentrations in the coal-tar-based sealcoat product are about 1,000 times higher than in the asphalt-based product (more than 50,000 milligrams per kilogram [mg/kg] in coal-tar-based products and 50 mg/kg in asphalt-based products [City of Austin, 2005]). Anecdotal reports, such as Web sites, blogs, and comments by industry representatives, indicate that the coal-tar-based product is used predominantly east of the Continental Divide and the asphalt-based product is used predominantly west of the Continental Divide. During 2007–08, the USGS swept dust from sealcoated and unsealcoated parking lots in nine cities across the United States and analyzed the dust for PAHs. For six cities in the central and eastern United States, the median PAH concentration in dust from sealcoated parking lots was 2,200 mg/kg, about 1,000 times higher than in dust from sealcoated parking lots in the western United States, where the median concentration was 2.1 mg/kg. Although both product types are available nationally, these results confirm the regional difference in use patterns (Van Metre and others, 2009).

C. Are those effects unacceptable to the community?

As you know the EPA and others have determined "acceptable risk" for many exposures and risks in our society. By this measure, the use of coal tar pavement sealers is federally "unacceptable."

The article, entitled "Cancer Risk from Incidental Ingestion Exposure to PAHs Associated with Coal Tar Sealed Pavements," is a further refinement of work led by Dr. Spencer Williams, a toxicologist from Baylor University and co-authored by Drs. Barbara Mahler and Peter Van Metre of the USGS.

The essence of the paper is really contained in this graph. If you take your time to understand it, these are the key points:

- There is some cancer risk from ingestion from background PAH (polycyclic aromatic hydrocarbons) sources that we get from food and the environment, but it is in a risk range that the EPA would review on a case-by-case basis. This is why we frequently hear public service announcements to minimize eating grilled meat and exposure to tobacco smoke (incidental 2nd hand if you will).
- Any exposure scenario from the proximity to coal tar sealed asphalt puts the risk into the zone of "desired remediation" or as stated previously "federally unacceptable."
- Most exposure comes from coal tar sealant contaminated soil instead of indoor dust.
- Early childhood exposure is most troubling, but so is also in the red zone is a lifetime of exposure or even just exposure during adulthood.

Effects are still being learned, but cancer risks to children are similar to second-hand smoke. How does that risk compare to an exposure to cigarettes? A study published (http://www.ncbi.nlm.nih.gov/pubmed/7729384) at the National Institutes for Health states the risk of getting lung cancer for a female non-smoker working or living with a smoker is about the same as the risk of getting cancer from a coal tar sealed parking lot!

That is my quick summary of the Framework. I have attached a detailed bibliography of sources on PAHs and human health which I assembled to garner the support of the Chicago Physicians for Social Responsibility, who have endorsed action against the use of this product in Chicago, Texas, Maine and New York.

More on the other email later.

Tom

Trustee Fessler:

Thank you for your thoughtful questions during the July 8th Study Session on this topic. While I am hopeful and encouraged by the general direction of the Board, you may desire a fuller response to garner your confident support.

But please let me briefly introduce myself. After implementing and defending the nation's first ban of this material in Austin, Texas, I saw a growing gap in the understanding on this issue. The EPA, state agencies and environmental organizations appeared disinterested in tackling this paramount pollutant. So I launched this effort, Coal Tar Free America, to advocate and educate about this product, which is done completely on a voluntary basis with no industry funding. A more detailed resume of my experience can be found here. http://1.bp.blogspot.com/-XhkfAieIHLM/UwSwpSDk6WI/AAAAAAAADzE/-GnjwFRMGQw/s1600/Tom+Ennis+Infographic.JPG

Ironically I have actually done drainage design work in Winnetka in my previous private civil engineering employment in the Chicago area!

After watching the video a few times, it appears you have about seven questions. I will answer them in order except for the first one.

1. FRAMEWORK

You had asked about the framework and perspective on this pollutant. As Winnetka moves forward on many pollutants, how do you discern the priorities? I would suggest the following matrix of thinking for any pollutant source:

A. Is it toxic to humans or the environment?
B. Is it found at concentrations that can have an effect?
C. Are those effects unacceptable to the community?
D. Can the use or source be controlled in an reasonable way?

If you run coal tar sealers through this line of questions, and compare the certainty of your answers to any other stormwater pollutant, then it will rise to the top:

Coal Tar Sealers:
A. yes, carcinogenic, teratogenic (birth defects), toxic, and mutagenic
B. yes, standard effects concentration is 23 ppm and the product can be 70,000 ppm
C. Effects are still being learned, but cancer risks to children are similar to second-hand smoke and in a range of cancer risk that the EPA classifies as "unacceptable."
D. Yes simple substitutes are available (more on that question later).

2. PROBLEM IN WINNETKA?

This can be looked at from two perspectives: driveway and the watershed.

Each driveway represents a health risk to community. It only takes one driveway to represent a significant health risk. For each child living with a coal tar sealed surface, they are at risk. Since most folks in Winnetka use coal tar, each CT sealed driveway is a problem unto itself. How many is too many? I would submit one is too many with such an inane use of a toxic product.

At the watershed level, one of your neighboring areas, DuPage County, (http://coaltarfreeamerica.blogspot.com/2014/01/chicagoland-home-of-most-toxic-creeks.html) has done research at a watershed area and found the greatest frequency of PAH toxicity in their creeks ever recorded in the US. How does that compare to Winnetka? Similar I would submit, but not exact. On the one hand there are more commercial areas and large parking lots in DuPage (increasing CT usage), but on the other hand there are most likely more DIY-types that would only use asphalt based products available from home improvement stores. All in all, it isn't that different.

3. EPA PERSPECTIVE

I get this question a lot. Don't ask me to explain why or the reasonableness of their actions, but here is what the EPA is up to on this:

- *They did their own studies and found CT sealers a problem, but recommended communities pass their own bans.*
- *they give grants to encourage states and regions to cease coal tar use.*
- *they sponsor webinars on the problems of coal tar sealers.*
- *they publish brochures encouraging communities to move away from it*

Here's a link to read more. http://coaltarfreeamerica.blogspot.com/2012/11/us-epa-releases-new-info-on-coal-tar.html

4. STATE OF ILLINOIS PERSPECTIVE

A statewide ban bill was heard in committee earlier this year and it failed to get out of committee. I wrote about it here. http://coaltarfreeamerica.blogspot.com/2014/04/illinois-ban-failsillinoisians.html

Why haven't they regulated it? I believe they are still in the dark about the disposal costs of contaminated sediment from detention ponds. The looming cost of over a billion dollars in the Twin Cities region led to the statewide ban in Minnesota. I estimate a similar cost burden awaiting Illinois taxpayers, but very little pond testing has taken place.

5. ASPHALT SEALER AVAILABILITY

While I heard your difficulty in getting a positive response in your survey of applicators, the fact is most sealer manufacturers make both asphalt based and coal tar based products. You can read an industry piece on that here. http://www.forconstructionpros.com/article/10298662/understanding-sealer-options

6. CAPACITY AND COST OF A BAN

I wrote about the ease of doing a coal tar ban based upon my Austin experience, here. (http://coaltarfreeamerica.blogspot.com/2011/08/worry-free-guide-to-implementing-coal.html) It isn't very hard to do, but one must be thoughtful in its execution.

The cost/benefit of a ban is prudent pollution prevent. The National Research Council, who advises Congress on scientific matters said of the Austin ban:

The City of Austin's encounter with coal tar-based asphalt sealants provides an illustration of the types of products contributing toxins to stormwater discharges that could be far better controlled at the production or marketing stage. (http://coaltarfreeamerica.blogspot.com/2011/11/austin-ban-illustrates-prudent.html)

7. IS LOCAL BEST PLACE?

I have worked with some US Congress members on a nationwide ban. Even with some testimonies before Congress on this issue, it has not yet gotten political traction. Yes that would be easiest, but even the sponsor of the bill, Congressman Lloyd Doggett, recently stated that local bans are necessary to embolden state and national efforts. Winnetka represents such an action. I hope you can support that effort.

Please let me know if you have any additional questions.

Tom

While our understanding continues to develop on coal tar sealants, polycyclic aromatic hydrocarbons (PAHs) and human health, occasionally it is good to pull all of what we know together into a succinct summary. That is my hope here.

There are a few studies that have been done directly on coal tar sealants and human health, but many others that either increase our understanding of the concentrations, use, mobility, and bioavailability for coal tar pavement sealants or those that demonstrate the human health effects of PAH. These three categories serve to inform us of the reasonableness of actions to curtail the use and exposure to coal tar pavement sealers.

My contention is that when the facts are laid before us, it presents a compelling reason to stop the use of this product especially in areas where children will be exposed. Some of the information presented below is from a recent summary of research compiled by the USGS as the Edwards Aquifer Authority (Texas) considers a ban of coal tar sealers.

Direct Studies of Human Health and Coal Tar Sealcoat

Williams, E. S.; Mahler, B. J.; Van Metre, P. C. Coal-tar pavement sealants might substantially increase children's PAH exposures. Environ. Pollut. 2012.

This "New Initiatives" article in Environmental Pollution estimates that, although dietary ingestion has long been thought to be the primary route of human exposure to polycyclic aromatic hydrocarbons (PAHs), for children 3-5 years of age living in residences adjacent to parking lots with coal-tar-based sealcoat, non-dietary ingestion of PAHs (i.e., ingestion of house dust) is about 2.5 times that of dietary ingestion.

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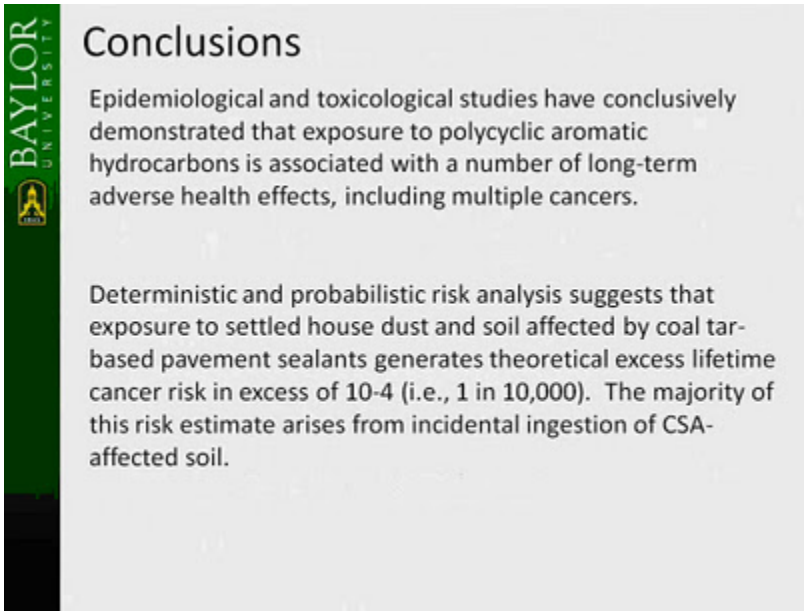
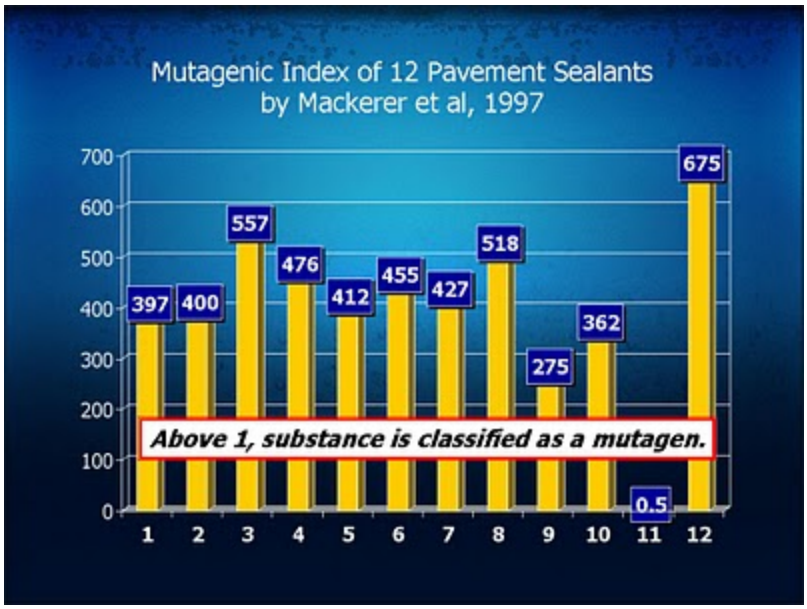


"CSA"-coal tar sealant affected

Legally, Title 40 of the Code of Federal Regulations (CFR) Section 300.430(e)(2)(i)(A)(2) states that an estimate of excess cancer risk associated with a site that exceeds 1×10^{-4} is considered unacceptable. This forms a sufficient basis for EPA to order cleanup. An estimate of the cancer risk associated with a site that is less than 1×10^{-4} but greater than 1×10^{-6} may be considered unacceptable and may be a sufficient basis for ordering cleanup.

from *Site Remediation Planning and Management* by J. Andy Soesilo, Stephanie R. Wilson, p,243*1*.

Mackerer, C. R. et al; Mutagenicity and PAC Content of Seal Coatings for Asphalt Pavement. 16th International Conference on Polycyclic Aromatic Compounds, November 1997.



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The only problem with this is that it has never been published, but is only a collection of slides summarizing the team's work.

Mahler, B.J.; Van Metre, P.C.; Crane, J.L.; Watts, A.W.; Scoggins, M.; Williams, E.S., Coal-tar-based Pavement Sealcoat and PAHs: Implications for the Environment, Human Health, and Stormwater Management. Environ. Sci. Technol., 2012.

This paper compiles the state of our knowledge about the environmental and human health effects of coal tar sealant as well as the status of legislative action has just been published. In addition to the USGS, contributors included the State of Minnesota

Pollution Control Agency, the University of New Hampshire, Baylor University and the City of Austin.

The intent of the report is to present much of what has already been published in one document with new information on human health effects and the volatilization of curing sealant.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, Public Health Service Agency for Toxic Substances and Disease Registry, Division of Health Assessment and Consultation: Health Consultation for Leander Independent School District, Proposed Elementary School #19, (Grandview Hills Elementary), Austin, Travis County, Texas, EPA FACILITY ID: TXN000606777, February 13, 2008.

For years it was hoped that the federal government toxicologists would just look at the safety of children exposed to coal tar sealants. A few years ago it was discovered that they already had, but it was coincidental. A school district outside of Austin, Texas (Leander) was looking to build a new elementary school. They purchased a property that met their needs except that it had been a chemical research facility. When parents found out, many were very upset. So upset that they got the attention of their elected officials, who in turn brought in the feds (more specifically the Agency for Toxic Substances and Disease Registry ATSDR, who routinely does this kind of work).

They tested the soil and analyzed the risks. They found relatively high levels (69 mg/kg, but nothing near the highest in pavement dust by the USGS: 3200 mg/kg*) of polycyclic aromatic hydrocarbons (PAHs) in the soil near where there were parking lots and the source was determined to be coal tar pavement sealants. The levels were sufficient to increase cancer risk in a low to moderate range if it remained at the proposed site. As a result soils were removed under the description of "remediaton."*

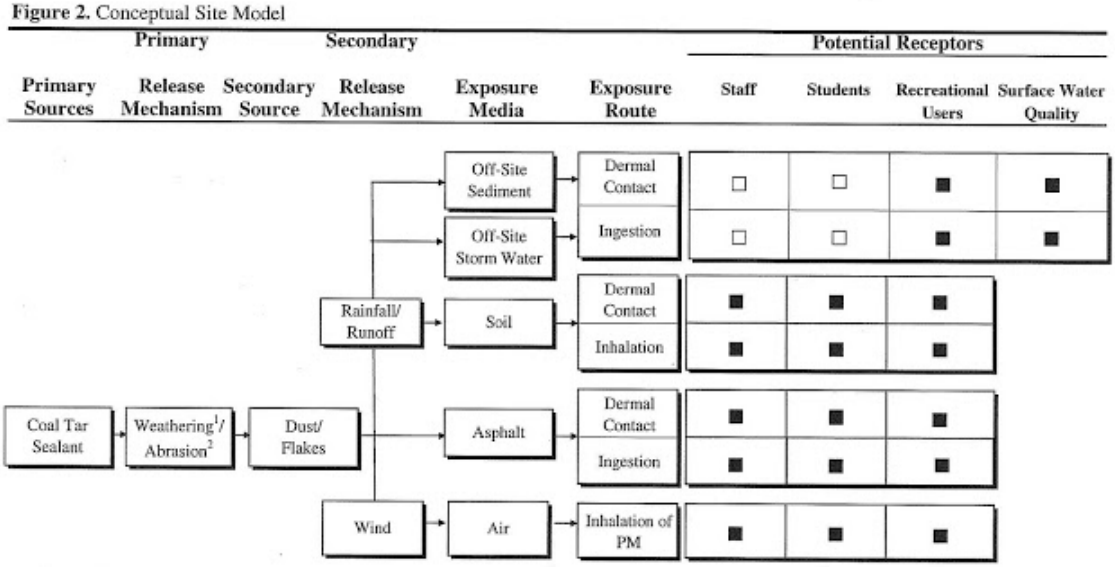
Keifer, K; Summary of Preliminary Evaluation of Potential Risks from Existing Coal Tar Sealants, Environmental Resources Management, Inc. April 2010.

In 2009 the Austin Independent School District (AISD) began to look into this issue at their schools. Below is a link to an interview that was made just as the study was getting started. Since then their toxicologist consultant found that there exist 5 complete CTS exposure pathways from paved surface to child or adult at the school! AISD has since begun a program to prioritize and remove all coal tar sealant remnants from their facilities. They are the first in the nation to do so.

An exposure pathway is defined by the ATSDR as follows:

The route a substance takes from its source (where it began) to its end point (where it ends), and how people can come into contact with (or get exposed to) it. An exposure pathway has five parts: a source of contamination (such as an abandoned business); an environmental media and transport mechanism (such as movement through groundwater); apoint of exposure (such as a private well); a route of exposure (eating, drinking, breathing, or touching), and a receptor population (people potentially or actually exposed). When all five parts are present, the exposure pathway is termed a completed exposure pathway.

Figure 2. Conceptual Site Model



■ - Potentially complete exposure pathway.
□ - Incomplete or insignificant exposure pathway.

Note:
PM = Particulate matter
[1] = Weathering by sun, rain, wind, and freezing.
[2] = Abraision by foot traffic, autos, and other site use activities.

Complete Exposure Pathways at Schools from Coal Tar Sealants

PAHs underfoot: Contaminated dust from coal-tar sealcoated pavement is widespread in the United States. Van Metre, P. C.; Mahler, B. J.; Wilson, J. Environ. Sci. Technol. 2009, 43, (1), 20-25. Environ. Sci. Technol. 2009, 43, (1), 20-25.

This scientific journal article reports that concentrations of PAHs in dust swept from parking lots across the central, southern, and eastern U.S.—where coal-tar-based sealcoat use is most common—are in the 1000s of mg/kg, concentrations similar to those in contaminated soils of USEPA Superfund Sites. Some concentrations found to be 5300 times greater than generic soil screening level (SSL) of 0.09 mg/kg used by the U.S. Environmental Protection Agency Superfund Program.

Coal-tar-based parking lot sealcoat: An unrecognized source of PAH to settled house dust. Mahler, B. J.; Van Metre, P. C.; Wilson, J. T.; Musgrove, M.; Burbank, T. L.; Ennis, T.; Bashara, T. J., Environ. Sci. Technol. 2010, 44, 894-900.

This scientific journal article reports that concentrations of PAHs in house dust in residences adjacent to parking lots with coal-tar-sealcoated pavement were 25 times higher than those in house dust in residences adjacent to parking lots with unsealed pavement or pavement with asphalt-based sealcoat.

Human Health Studies Regarding PAH Effects

Coal-tars and Derived products. 1985 International Agency for Research on Cancer (IARC) vol 35, 83 p.

This landmark document describes the carcinogenic properties of coal tars and coal-tar pitches, and finds that there is sufficient evidence that coal-tar pitches are carcinogenic in humans.

Association of childhood obesity with maternal exposure to ambient air polycyclic aromatic hydrocarbons during pregnancy. Rundle A, Hoepner L, Hassoun A, Oberfield S, Freyer G, Holmes D, Reyes M, Quinn J, Camann D, Perera F, Whyatt R; Am J Epidemiol. 2012 Jun 1;175(11):1163-72. Epub 2012 Apr 13.

The data indicate that prenatal exposure to PAHs is associated with obesity in childhood.

Prenatal Airborne Polycyclic Aromatic Hydrocarbon Exposure and Child IQ at Age 5, Pediatrics, Jul 20, 2009.

Researchers at the Center for Children's Environmental Health (CCCEH) at the Mailman School of Public Health find that exposure to urban air pollution during pregnancy can result in lower IQ in children. Air pollutants known as PAH's (polycyclic aromatic hydrocarbons) mostly come from traffic sources, including burning diesel fuel. Burning tobacco also releases PAHs. The result of burning fossil fuels is now linked to lower IQ, and the effects occur before birth.

Effect of Prenatal Exposure to Airborne Polycyclic Aromatic Hydrocarbons on Neurodevelopment in the First 3 Years of Life among Inner-City Children, Environ Health Perspect. 2006 August.

Residential Proximity to Freeways and Autism in the CHARGE Study, Environ Health Perspect. 2011 June.

Living near a freeway was associated with autism. Examination of associations with measured air pollutants is needed.

Biological and Ecological Health

The effects of coal tar based pavement sealer on amphibian development and metamorphosis. 2006. Bryer, P.J., Elliott, J.N., and Willingham, E.J. , Ecotoxicology, vol. 15(3), 241-247.
This scientific journal article reports that exposure to sediment contaminated with coal-tar-based pavement sealer resulted in stunted growth and slower development of the frog Xenopus laevis.

Coal-tar based pavement sealant toxicity to freshwater macroinvertebrates. Bryer, P.J., Scoggins, M., and McClintock, N.L., 2009. Environmental Pollution, v. 158, no. 5, p. 1932-1937.

This scientific journal article reports that exposure to sediment contaminated with coal-tar-based sealcoat resulted in decreased abundance and richness of freshwater macroinvertebrates, an important element in the aquatic food chain.

Occurrence of polycyclic aromatic hydrocarbons below coal-tar-sealed parking lots and effects on stream benthic macroinvertebrate communities. Scoggins, M., McClintock, N., Gosselink, L., and Bryer, P., 2007. Journal of the North American Benthological Society, v. 26, no. 4, p. 694-707.

This scientific journal article reports a significant decrease in the health of the ecological community downstream from points of discharge of runoff from coal-tar-sealcoated parking lots relative to ecological communities upstream.

Toxicity of coal—tar and asphalt sealants to eastern newts, Notophthalmus viridescens. 2010. Bommarito, T., Spading, D.W., and Halbrook, R.S.

This scientific journal article reports that exposure of eastern newts to sediment contaminated with coal-tarbased sealcoat resulted in deleterious effects, including difficulty right themselves, impaired ability to swim, and diminished liver enzyme activities.

Toxicity of coal-tar pavement sealants and ultraviolet radiation to Ambystoma Maculatwn. 2010. Bommarito, T., Sparling, D.W., and Halbrook, R.W.

This scientific journal articles reports that spotted salamanders exposed to sediment contaminated with coal-tar-based sealcoat in sediment had slower rates of growth and diminished ability to swim. Subsequent exposure to ultra-violet radiation resulted in genetic damage.

Coal Tar Sealant Concentrations, Use, and Mobility

Coal-tar-based pavement sealcoat, polycyclic aromatic hydrocarbons (PAHs), and environmental health. Mahler, B.J., and Van Metre, P.C., 2011, U.S. Geological Survey Fact Sheet 2011-3010, 6 p. http://pubs.usgs.gov/fs/2011/3010/
This USGS fact sheet provides an overview of the ways in which coal-tar-based sealcoat contaminates pavement dust, lake sediment, and house dust.

Coal-tar-based pavement sealcoat and PAHs: Implications for the environment, human health, and stormwater management. Mahler, B.J.; Van Metre, P.C.; Crane, J.L.; Watts, A.W.; Scoggins, M.; Williams, E.S., Environ. Sci. Technol., 2012.

This Feature article in Environmental Science and Technology summarizes the ways in which coal-tarbased sealcoat contaminates stormwater runoff, lake sediment, soil, house dust, and air, and implications for human and biological health and stormwater management.

Parking lot sealcoat: An unrecognized source of urban PAHs. Mahler, B. J.; Van Metre, P. C.; Bashara, T. J.; Wilson, J. T.; Johns, D. A., Environ. Sci. Technol. 2005, 39, (15), 5560-5566.

This article was the first to report the potential for coal-tar-based pavement sealcoat to be an important source of PAH contamination. The study of runoff from 13 parking lots found that concentrations of PAHs in particles in runoff from pavement with coal-tar-based sealcoat was, on average, 65 times higher than concentrations in particles in runoff from unsealed asphalt parking lots.

Contamination of Stormwater Pond Sediments by Polycyclic Aromatic Hydrocarbons (PAHs) in Minnesota: The Role of Coal Tar-based Sealcoat Products as a Source of PAHs. Crane, J.L., Grosenheider, K., and Wilson, C.B., 2010, Minnesota Pollution Control Agency, 64 p.

This white paper by the Minnesota Pollution Control Agency describes the filling of stormwater ponds with PAH-contaminated sediments, the expense of deposing of the

sediments, and the likelihood that coal-tarbased pavement sealants are a substantial contributor to the problem.

Concentrations of Polycyclic Aromatic Hydrocarbons (PAHs) and Major and Trace Elements in Simulated Rainfall Runoff from Parking Lots, Austin, Texas, 2003. Mahler, Barbara J.; Van Metre, Peter C.; Wilson, Jennifer T. 2004. USGS OFR 2004-1208. http://pubs.usgs.gov/of/2004/1208/

This report was subject to an "Information Quality Act" challenge from the sealcoat industry, to which the USGS responded. A press release summarized the USGS response. http://www.usgs.gov/newsroom/article.asp?ID=1642&from=rss#.UI3JisXR7tA. This USGS report provides the data used in Mahler et al., 2005.

Trends in Hydrophobic Organic Contaminants in Lake Sediments Across the United States, 1970-2001. Van Metre, P.C. and Mahler, BJ., 2005. Environ. Sci. Technol., v. 39, no. 15, p. 5567-5574.

This scientific journal article documents upwards trends in PAH contamination in sediment in urban lakes across the United States.

PAHs underfoot: Contaminated dust from coal-tar sealcoated pavement is widespread in the United States. Van Metre, P. C.; Mahler, B. J.; Wilson, J. Environ. Sci. Technol. 2009, 43, (1), 20-25. Environ. Sci. Technol. 2009, 43, (1), 20-25.

This scientific journal article reports that concentrations of PAHs in dust swept from parking lots across the central, southern, and eastern U.S.—where coal-tar-based sealcoat use is most common—are in the 1000s of mg/kg, concentrations similar to those in contaminated soils of USEPA Superfund Sites.

Polycyclic aromatic hydrocarbons in stormwater runoff from sealcoated pavements. Watts, A.W., Ballestero, T.P., Roseen, R.M., and House, J.P., Environ. Sci. Technol. 2010, v. 44(23), 8849-8854.

This scientific journal article reports that even partial coverage of a drainage area by coal-tar-based sealant resulted in increased PAH concentrations in sediment. A stormwater swale receiving runoff from both sealed and unsealed lots had PAH concentrations 25 times higher after sealant was applied than prior to sealant application.

Influence of coal-tar sealcoat and other carbonaceous materials on polycyclic aromatic hydrocarbon loading in an urban watershed. Yang, Y., Van Metre, P.C., Mahler, B.J.,

Wilson, J.T., Ligouis, B., Razzaque, M.M., Schaeffer, D.J., and Werth, CJ., 2010,: Environ. Sci. Technol., v. 44, p. 1217-1223.

This scientific journal article reports research using organic petrography to quantitatively determine the proportion of PAHs in dust and soil samples originating as coal-tar pitch. The study found that coal-tar pitch, used in coal-tar-based sealcoat, was a dominant source of PAHs in the watershed, contributing as much as 99% of the PAHs in sealed parking lot dust, 92% in unsealed parking lot dust, 88% in commercial area soil, 71% in streambed sediment, and 84% in surficial lake sediment.

Contribution of PAHs from Coal-Tar Pavement Sealcoat and Other Sources to 40 U.S. Lakes. Van Metre, P. C.; Mahler, B. J. Sci. of the Total Environ., 2010, v.409, 334-344.

This scientific journal article reports that coal-tar-based sealcoat was, on average, the largest source of PAHs to sediment in 40 U.S. lakes, on the basis of a statistical source-apportionment approach. The article also reported that coal-tar-based sealcoat was the source of upward trends in PAH concentrations in seven of eight urban lakes investigated.

Volatilization of polycyclic aromatic hydrocarbons from coal-tar-sealed pavement. Van Metre, P. C.; Majewski, M. S.; Mahler, B. J.; Foreman, W. T.; Braun, C. L.; Wilson, J. T.; Burbank, T. Chemosphere, 2012.

This scientific journal article reports PAH releases to air from in-use parking lots with and without coal-tarbased sealcoat. The mass of PAHs released to air per unit area of coal-tar-sealed pavement was 60 times greater than that released from unsealed asphalt pavement, even though in all but one case the sealant had been applied from 3 to 8 years prior to sampling.

PAH volatilization following application of coal-tar-based pavement sealant. Van Metre, P. C.; Majewski, M. S.; Mahler, B. J.; Foreman, W. T.; Braun, C. L.; Wilson, J. T.; Burbank, T. Atmos. Environ. 2012.

This scientific journal article reports enormous releases of PAHs to the atmosphere (one-quarter to one-half of the PAHs contained in the product) during the 15 days following application of coal-tar-based sealant. The authors estimate that PAH emissions from new coal-tar-based sealcoat applications each year (-1000 Mg) are larger than annual vehicle emissions of PAHs for the United States.

DEPARTMENT OF PUBLIC HEALTH
CITY OF CHICAGO

Departmentof Public Health Testimony
Committee on Finance
June 7, 2013, 10:00 AM

Good morning Chairman Burke and committee members. My name is Dr. Cortland Lohff, and I am the Medical Director for Environmental Health at the Chicago Department of Public Health.

The Chicago Department of Public Health supports the proposed ordinance to prohibit the sale and use of coal tar sealants. CDPH believes the research warrants the attention of policy makers and it provides a solid evidence base for the proposed ban or other measures to address the adverse health impact of coal tar sealants.

Coal tar is a byproduct of the coking of coal for the steel industry and coal tar pitch, which makes up about 20 to 35 percent of coal-tar-based sealcoats, is itself 50 percent or more polycyclic aromatic hydrocarbons (PAHs) by weight. According to the U.S. Environmental Protection Agency, PAHs are of concern because several are toxic, carcinogenic, mutagenic and/or teratogenic to aquatic life and seven are probable human carcinogens.

Coal tar based sealants are commonly applied to parking lots, residential driveways and playgrounds. According to a United States Geological Survey (USGS) study, apartments with coal tar-based sealcoats on the parking lot had much higher concentrations of PAHs, both in indoor dust and in parking lot dust, than apartments with parking lots with other surfaces.

The USGS is not alone in its concern. The evidence base for banning coal tar sealants is growing rapidly. For example, a study just published in the *Journal of Exposure Science & Enviro Epidemiology* confirms the heightened fetal susceptibility to prenatal PAH exposure.[1] The authors conclude PAH exposure should be a matter of public health concern.[1] Another study, published in *Environmental Science & Technology*, indicates that the presence of coal-tar-based pavement sealants is associated with significant increases in estimated excess lifetime cancer risk for nearby residents. Much of this calculated excess risk arises from exposures to PAHs in early childhood (*i.e.*, 0–6 years

[1] **The relationship between prenatal exposure to airborne polycyclic aromatic hydrocarbons (PAHs) and PAH-DNA adducts in cord blood**. J Expo Sci Environ Epidemiol. (Jan. 9, 2013). [e-publication ahead of print]

of age).[2] Yet another study, also published in *Environmental Science & Technology*, indicates that even a small amount of seal coated pavement can be the dominant source of PAHs to sediment in storm water-retention ponds;[3] proper disposal of such PAH-contaminated sediment can be extremely costly.[3] Authors concluded by noting that several local governments, the District of Columbia, and the State of Washington have banned use of these products, and several national and regional hardware and home-improvement retailers have voluntarily ceased selling them.[3] All three of these studies were published in just the last year, which underscore our rapid and emerging awareness of a need for policy makers to develop policy regarding the sale and use coal tar.

There are currently no U.S. health-based guidelines for chronic exposure to PAHs. The only guideline available is one from the German Federal Environment Agency Indoor Air Hygiene Commission which advises minimizing exposure to concentrations of a certain type of PAH benzoapyrene greater than 10 mg/kg in dust to avoid adverse health effects.

According to the USGS, PAHs are increasing in urban lakes across the United States, which has prompted several cities, counties and states to have placed restrictions or discontinued the use of coal-tar sealants. The Village of Lake in the Hills, Illinois and Spring Grove, Illinois has enacted restrictions on government use of coat tar sealants. South Barrington, Illinois and 28 cities in Minnesota have implemented a ban on coal tar sealants.

The Department can also provide a list of additional citations for peer-reviewed literature related to coal tar.

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[2] E. Spencer Williams, Barbara J. Mahler, Peter C. Van Metre. **"Cancer Risk from Incidental Ingestion Exposures to PAHs Associated with Coal-Tar-Sealed Pavement."** Environ. Sci. Technol., 2013, 47 (2), 1101–1109.

[3] Mahler et al, **Coal Tar-Based Pavement Sealcoat and PAHs: Implications for the Environment, Human Health, and Stormwater Management, Environmental Science and Technology** (2012), Vol. 46, 3039-3045.

ADDITIONAL RESOURCES

Bryer et al, **Coal Tar-Based Pavement Sealant Toxicity to Freshwater Macroinvertebrates**, Environmental Pollution (2010) Vol. 158, pg. 1932-1937.

LaVista and Mahler, **Coal Tar Sealcoats a Major Source of PAHs to Air and to Children Living Nearby**, United States Geological Survey, February 13, 2012.

Mahler et al, **Coal Tar-Based Parking Lot Sealcoat: an Unrecognized Source of PAH to Settled House Dust**, Environmental Science and Technology (2010), Vol. 44 No. 3, pg. 894-900.

Murakami et al, **Modeling of Runoff Behavior of Particle-Bound Polycyclic Aromatic Hydrocarbons (PAHs) from Roads and Roofs**, Water Research (2004), Vol.38 pg. 4475-4483.

Van Metre et al, **Contributions of PAHs from Coal Tar Pavement Sealcoat and Other Sources to 40 U.S. Lakes**, Science of the Total Environment (2010) Vol. 409, pg.334-344.

Van Metre et al, **PAHs Underfoot: Contaminated Dust from Coal Tar Sealcoated Pavement is Widespread in the United States**, Environmental Science and Technology (2009), V.43 No.1, pg. 20-25.

Williams et al, **Coal Tar Pavement Sealants Might Substantially Increase Children's PAH Exposure**, Environmental Pollution, 164 (2012) pg. 40-41.

Yaning et al, **Influence of Coal Tar Sealcoat and Other Carbonaceous Materials on Polycyclic Aromatic Hydrocarbon Loading in an Urban Watershed**, Environmental Science and Technology (2010), Vol. 44, pg. 1217–1223.