REQUEST FOR COUNCIL ACTION

Date: 05/23/11
Item No.: 13.d

Department Approval | City Manager Approval

Item Description: Consider an Ordinance Regulating the Use of Coal Tar Based Sealers

BACKGROUND

The Public Works Environment and Transportation Commission recommends the City Council consider adopting an ordinance banning the use of coal tar based driveway sealants. These sealants are receiving considerable attention at the MPCA due to the potential health hazards that exist when they end up in storm water pond sediments. This type of driveway sealant was more prevalent in years past. The coal tar sealer flakes off from driveways over time and storm water runoff carries the material to storm water ponds. The coal tar sealants contains polycyclic aromatic hydrocarbons (PAH) which are known carcinogens. Due to the toxic nature, the sediments from storm water ponds are now required to be tested and classified for disposal. When certain levels of these substances are found the sediments need to be disposed of in hazardous materials landfills. This is very costly and is a metro wide problem, especially in the first and second tier suburbs as these materials were applied to driveways for many years. We have found these substances in two recent pond maintenance projects completed by watershed districts in Roseville. Oasis Pond restoration project completed by Rice Creek Watershed District and the William Street Pond project completed by Capitol Region Watershed District had high levels of PAH and required disposal at significantly high cost.

The Legislature considered a state wide ban on coal tar based sealant products in 2010 but did not pass legislation. There was no legislation introduced in this year's legislative session.

Coal tar sealers are no longer sold by most hardware stores and home improvement stores. They are still available and are being marketed by door to door driveway coatings contractors.

Staff requested the City Attorney modify the League of Minnesota Cities model ordinance, which allowed diluted coal tar sealers, to reflect a total ban on coal tar emulsions similar to ordinances adopted in White Bear Lake, Maplewood, and other communities.

Attached is the draft ordinance for this discussion. (Attachment A) We have also attached additional information from USGS regarding coal tar sealants. (Attachment B)

POLICY OBJECTIVE

The City's Comprehensive Plan and the Comprehensive Storm Water Management Plan discuss the importance of protecting the city's water resources. This ordinance is consistent with that objective.

FINANCIAL IMPACTS

The adoption of this ordinance should not have a negative impact on city budgets or operations.

STAFF RECOMMENDATION

Staff recommends the Council consider adoption of the attached ordinance banning the use of coal tar base sealers in Roseville. The Public Works Environment and Transportation Commission has recommended the city ban the use of coal tar based driveway sealers in the City of Roseville.

REQUESTED COUNCIL ACTION

Discuss the proposed ordinance and provide staff direction on any desired changes.

Prepared by:

Duane Schwartz, Public Works Director

Attachments: **A. Draft Ordinance**
B. USGS Fact Sheets

ORDINANCE NO. _____

AN ORDINANCE REGULATING THE USE OF COAL TAR-BASED SEALER PRODUCTS WITHIN THE CITY OF ROSEVILLE, MINNESOTA

THE CITY COUNCIL OF THE CITY OF ROSEVILLE DOES ORDAIN:

SECTION 1. PURPOSE.

The City of Roseville understands that lakes, rivers, streams and other bodies of water are natural assets which enhance the environmental, recreational, cultural and economic resources and contribute to the general health and welfare of the community. The City of Roseville Comprehensive Plan supports protection of these resources.

The use of sealers on asphalt driveways is a common practice. However, scientific studies on the use of driveway sealers have demonstrated an adverse relationship between stormwater runoff and certain health and environmental concerns.

The purpose of this ordinance is to regulate the use of sealer products within the City of Roseville, in order to protect, restore, and preserve the quality of its waters.

SECTION 2. DEFINITIONS.

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

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

COAL TAR SEALER. A coal tar based sealer is a black liquid containing coal tar pitch that is sprayed or painted on asphalt parking lots and driveways.

COAL TAR. A byproduct of the process used to refine coal for the steel industry.

CITY. City of Roseville.

MPCA. Minnesota Pollution Control Agency

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

SECTION 3. PROHIBITIONS.

A. No person shall apply any coal tar-based sealer to any driveway, parking lot, or other surface within the City of Roseville.

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

C. No commercial sealer product applicator, residential or commercial developer, or other similar individual or organization shall direct any employee, independent contractor, volunteer, or other person to apply any coal tar-based sealer to any driveway, parking lot, or other surface within the City.

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

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

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

SECTION 4. EXEMPTION.

Upon the express written approval from both the City and MPCA, a person conducting bona fide research on the effects of coal tar-based sealer products or PHAs on the environment shall be exempt from the prohibitions provided in Section 3.

SECTION 5. ASPHALT-BASED SEALCOAT PRODUCTS.

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

SECTION 6. PENALTY.

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

SECTION 7. SEVERABILITY.

If any provision of this ordinance is found to be invalid for any reason by a court of competent jurisdiction, the validity of the remaining provisions shall not be affected.

SECTION 8. EFFECTIVE DATE.

This ordinance becomes effective on the date of its publication of a summary of the ordinance as provided by Minn. Stat. § 412.191, subd. 4, as it may be amended from time to time, which meets the requirements of Minn. Stat. § 331A.01, subd. 10, as it may be amended from time to time.

Passed by the Council this _____ day of _____, 20_____.

_____

Mayor

Attested:

_____

Clerk

USGS
science for a changing world

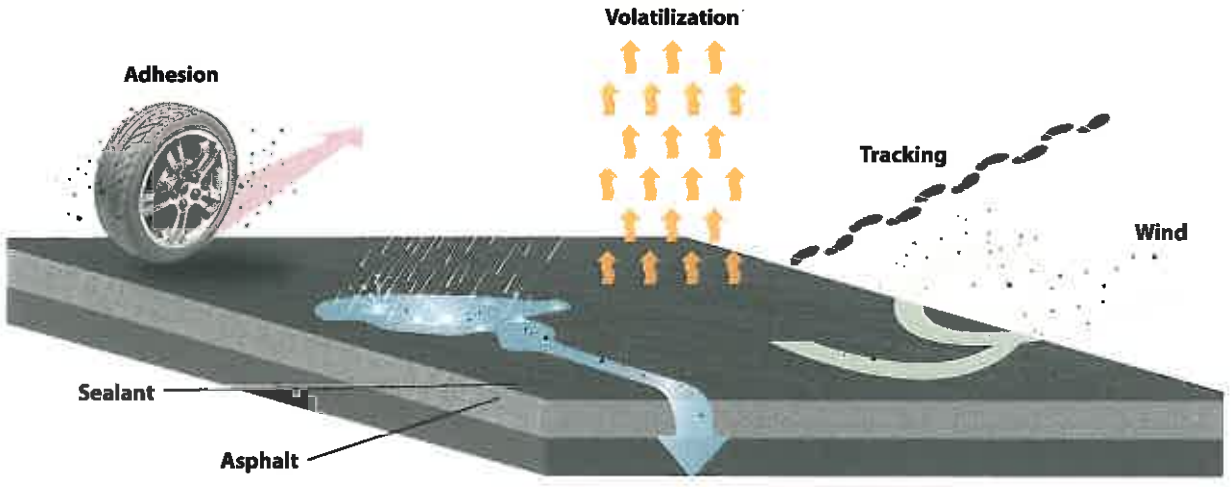
Coal-Tar-Based Pavement Sealcoat, Polycyclic Aromatic Hydrocarbons (PAHs), and Environmental Health

Studies by the U.S. Geological Survey (USGS) have identified coal-tar-based sealcoat—the black, viscous liquid sprayed or painted on asphalt pavement such as parking lots—as a major source of polycyclic aromatic hydrocarbon (PAH) contamination in urban areas for large parts of the Nation. Several PAHs are suspected human carcinogens and are toxic to aquatic life.

Sealcoat is the black, viscous liquid sprayed or painted on the asphalt pavement of many parking lots, driveways, and playgrounds.

Key Findings

- Dust from pavement with coal-tar-based sealcoat has greatly elevated PAH concentrations compared to dust from unsealed pavement.
- Coal-tar-based sealcoat is the largest source of PAH contamination to 40 urban lakes studied, accounting for one-half of all PAH inputs.
- Coal-tar-based sealcoat use is the primary cause of upward trends in PAHs, since the 1960s, in urban lake sediment.
- Residences adjacent to parking lots with coal-tar-based sealcoat have PAH concentrations in house dust that are 25 times higher than those in house dust in residences adjacent to parking lots without coal-tar-based sealcoat.
- PAHs move from a sealcoated surface into our environment by many mechanisms: storm runoff, adhesion to tires, wind, foot traffic, and volatilization.



Original graphic courtesy of Aaron Hicks, City of Austin, Texas.

What are Sealcoat, PAHs, and Coal Tar?

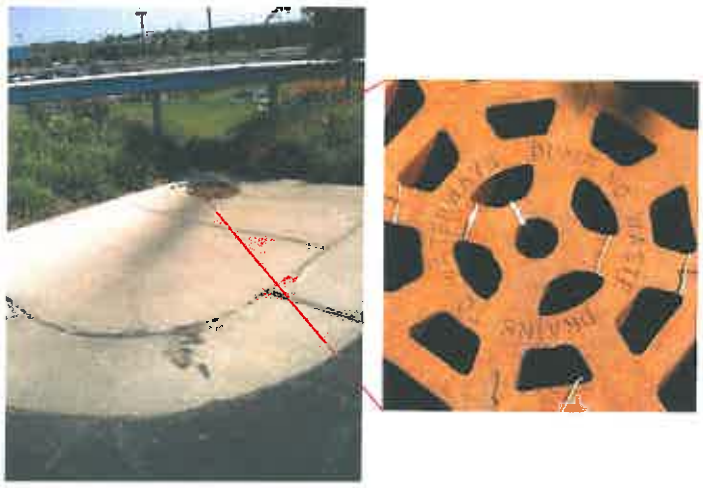
Pavement sealcoat (also called sealant) is a black liquid that is sprayed or painted on some asphalt pavement. It is marketed as protecting and beautifying the underlying pavement, and is used commercially and by homeowners across the Nation. It is applied to parking lots associated with commercial businesses, apartment and condominium complexes, churches, schools, and business parks, to residential driveways, and even to some playgrounds. Most sealcoat products have a coal-tar-pitch or asphalt (oil) base. Coal-tar-based sealcoat is commonly used in the central, southern, and eastern United States, and asphalt-based sealcoat is commonly used in the western United States.

PAHs are a group of chemical compounds that form whenever anything with a carbon base is burned, from wood and gasoline to cigarettes and meat. PAHs also are in objects and materials, such as automobile tires and coal tar, the production of which involves the heating of carbon-based materials. PAHs are of environmental concern because several are toxic, carcinogenic, mutagenic, and/or teratogenic (causing birth defects) to aquatic life, and seven are probable human carcinogens (U.S. Environmental Protection Agency, 2009).

Coal tar is a byproduct of the coking of coal for the steel industry and coal-tar pitch is the residue remaining after the distillation of coal tar. Coal-tar pitch is 50 percent or more PAHs by weight and is known to cause cancer in humans (International Agency for Research on Cancer, 1980). Coal-tar-based sealcoat products typically are 20 to 35 percent coal-tar pitch. Product analyses indicate that coal-tar-based sealcoat products contain about 1,000 times more PAHs than sealcoat products with an asphalt base (City of Austin, 2005).

How does Sealcoat get from Driveways and Parking Lots into Streams and Lakes, Homes, and the Air?

Friction from vehicle tires abrades pavement sealcoat into small particles. These particles are washed off pavement by rain and carried down storm drains and into streams. Other sealcoat particles adhere to vehicle tires and are transported to other surfaces, blown offsite by wind, or tracked indoors on the soles of shoes. Some of the PAHs in sealcoat volatilize (evaporate), which is why sealed parking lots and driveways frequently give off a "mothball" smell. Sealcoat wear is visible in high traffic areas within a few months after application, and sealcoat manufacturers recommend reapplication every 2 to 4 years.

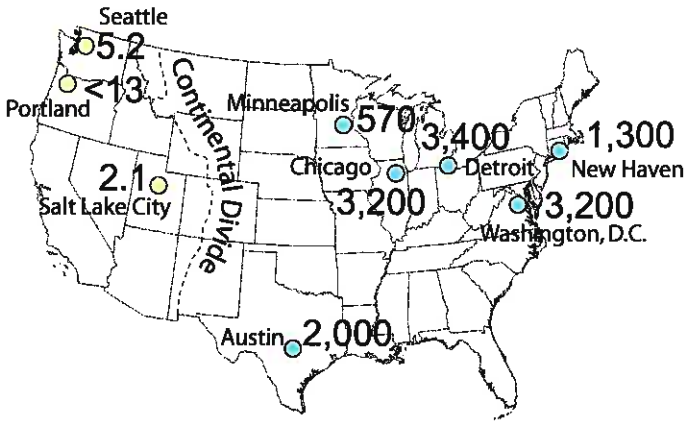


Runoff from sealcoated pavement (black surface) enters storm drains that lead to local streams. Drain grate (inset) is marked "DUMP NO WASTE" and "DRAINS TO WATERWAYS."

Gray asphalt pavement shows through where sealcoat has worn off the driveway of an apartment complex.

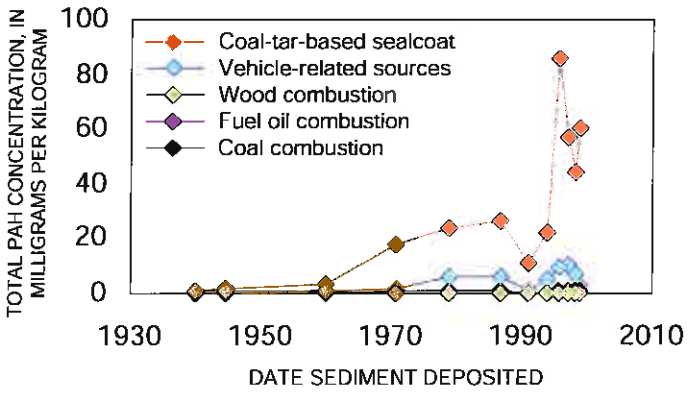
The East-West Divide
Regional Product Use Translates to Large Differences in PAH Concentrations

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).



Concentrations of PAHs in dust swept from sealed parking lots in central and eastern U.S. cities, where coal-tar-based-sealcoat use dominates, were about 1,000 times higher than in western U.S. cities, where asphalt-based-sealcoat use dominates. Concentrations shown on the map are the sum of 12 PAHs, in milligrams per kilogram (Van Metre and others, 2009).

"Fingerprinting" Shows that Coal-Tar Sealant is the Largest Source of PAHs to Urban Lakes

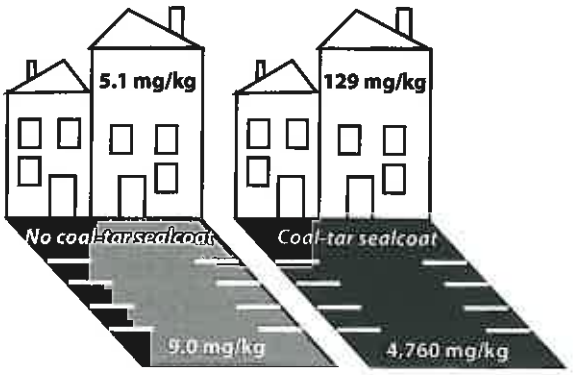


Coal-tar-based sealcoat (orange symbol) is the largest contributor to increasing concentrations of PAHs in Lake Killarney, Orlando, Florida, as determined by chemical fingerprinting. Similar patterns were seen in lakes across the central and eastern United States (Van Metre and Mahler, 2010).

PAHs are increasing in urban lakes across the United States. To better understand why this might be happening, USGS scientists collected sediment cores from 40 lakes in cities from Anchorage, Alaska, to Orlando, Florida, analyzed the cores for PAHs, and determined the contribution of PAHs from many different sources by using a chemical mass-balance model. The model is based on differences in the chemical "fingerprint" of PAHs from each source. Coal-tar-based sealcoat accounted for one-half of all PAHs in the lakes, on average, while vehicle-related sources accounted for about one-fourth. Lakes with a large contribution of PAHs from sealcoat tended to have high PAH concentrations; in many cases, at levels that can be harmful to aquatic life. Analysis of historical trends in PAH sources to 8 of the 40 lakes indicates that sealcoat use is the primary cause of increases in PAH concentrations since the 1960s. Identifying where PAHs are coming from is essential for developing environmental management strategies (Van Metre and Mahler, 2010).

From Outside to Inside
Coal-Tar Pavement Sealant Linked to PAHs in House Dust

House dust is an important source for human exposure to many contaminants, including PAHs. This is particularly true for small children, who spend time on the floor and put their hands and objects into their mouths. In 2008, the USGS measured PAHs in house dust from 23 ground-floor apartments and in dust from the apartment parking lots. Apartments with parking lots with coal-tar-based sealcoat had PAH concentrations in house dust that were 25 times higher, on average, than concentrations in house dust from apartments with parking lots with other surface types (concrete, unsealed asphalt, and asphalt-based sealcoat). PAH concentrations in the dust from the parking lots with coal-tar-based sealcoat were 530 times higher, on average, than concentrations on the parking lots with other surface types.



Apartments with coal-tar-based sealcoat on the parking lot had much higher concentrations of PAHs, both in indoor dust and in parking lot dust, than apartments with an unsealed asphalt or concrete parking lot or with a parking lot with asphalt-based sealcoat. Concentrations shown are for the sum of the 16 U.S. Environmental Protection Agency priority pollutant PAHs (Mahler and others, 2010), in milligrams per kilogram (mg/kg).

Photograph obtained from Jupiter Images.

What about other sources of PAHs? Although tobacco smoking, candle and incense burning, and barbecue and fireplace use have been suggested to affect PAH concentrations in house dust, this study found no relation between any of these, or the many other factors considered, and PAH concentrations in the house dust. The presence or absence of coal-tar-based sealcoat on the apartment complex parking lot was strongly correlated with PAH concentrations in house dust; the only other variable that was related to PAH concentrations in house dust was urban land-use intensity (the percentage of land near the apartment dedicated to multifamily residential, commercial, office, warehouse, or streets) (Mahler and others, 2010).

There are no U.S. health-based guidelines for chronic exposure to PAHs in house dust. The only existing guideline is for a single PAH—benzo[*a*]-pyrene—issued by the German Federal Environment Agency Indoor Air Hygiene Commission (Hansen and Volland, 1998). The guideline advises minimizing exposure to concentrations of benzo[*a*]pyrene greater than 10 mg/kg in dust to avoid adverse health effects. That guideline was exceeded for 4 of the 11 apartments with coal-tar-sealcoated parking lots and for 1 of the 12 apartments with a parking lot with a different surface type. Also of concern is exposure to the sealcoated pavement surfaces themselves through play activities. Dust on some of the sealcoated parking lots had a concentration of benzo[*a*]-pyrene that was more than 50 times higher than the German guideline.

Photograph courtesy of CLEARCorps, Durham, North Carolina.

Our Environment and Us
What are the Concerns?

Some PAHs are toxic to mammals (including humans), birds, fish, amphibians (such as frogs and salamanders), and plants. The aquatic invertebrates—insects and other small creatures that live in streams and lakes—are particularly susceptible to PAH contamination, especially those that live in the mud where PAHs tend to accumulate. These invertebrates are an important part of the food chain and are often monitored as indicators of stream quality (analogous to the "canary in the coal mine" concept). Possible adverse effects of PAHs on aquatic invertebrates include inhibited reproduction, delayed emergence, sediment avoidance, and mortality. Possible adverse effects on fish include fin erosion, liver abnormalities, cataracts, and immune system impairments. The Probable Effect Concentration (PEC) of 22.8 mg/kg of total PAHs (MacDonald and others, 2000)—a widely used sediment quality guideline that is the concentration in bed sediment expected to have harmful effects on bottom-dwelling biota—is exceeded in one-third of the central and eastern U.S. urban lakes where PAH sources were studied.

When turned over, red spotted newts that had been exposed to sediment contaminated with coal-tar-based sealcoat had difficulty righting themselves (Bommarito and others, 2010b). Poor reflexes could result in decreased survival. Photograph by Megan Gibbons, Birmingham-Southern College.

Scientific studies have shown a relation between coal-tar-based pavement sealcoat and harmful effects on aquatic life.

- Aquatic communities downstream from stormwater runoff from sealcoated parking lots were impaired (Scoggins and others, 2007).
- Salamanders and newts exposed to sediment contaminated with coal-tar-based sealcoat had stunted growth, difficulty swimming or righting themselves, and liver problems (Bommarito and others, 2010a, b).
- Frogs exposed to sediment contaminated with coal-tar-based sealcoat died, had stunted growth, or developed more slowly than usual (Bryer and others, 2006).

Tumors in brown bullhead catfish from the Anacostia River, Washington, D.C., are believed to be related to elevated PAH concentrations (Pinkney and others, 2009). Photograph by A.E. Pinkney.

Human health risk from environmental contaminants usually is evaluated in terms of exposure pathways. For example, people could potentially be exposed to PAHs in sealcoat through ingestion of abraded particles from driveways, parking lots, or play grounds, or through skin contact with the abraded particles, either directly or by touching toys or other objects that have been in contact with the pavement. Inhalation of wind-blown particles and of fumes that volatilize from sealed parking lots are other possible pathways. PAHs in streams and lakes rarely pose a human health risk from contact recreation or drinking water because of their tendency to attach to sediment rather than to dissolve in water.

Skin contact is one way humans can be exposed to PAHs. Parking lots and driveways with coal-tar-based sealcoat have concentrations of PAHs hundreds to thousands of times higher than those with asphalt-based sealcoat or no sealcoat. Photograph obtained from Corbis Images, Inc.

FAQ

Q) *What is coal tar?*

A) Coal tar is a thick, black or brown liquid that is a byproduct of the carbonization of coal for the steel industry or the gasification of coal to make coal gas.

Q) *What is the difference between crude coal tar, coal-tar pitch, and "refined" coal tar?*

A) Coal-tar pitch is the residue that remains after various light oils are distilled from crude coal tar for commercial use. The coal-tar pitch is then separated (refined) into 12 different viscosities, RT–1 (the most fluid) through RT–12 (the most viscous). RT–12 is the viscosity used in coal-tar-based pavement sealcoat.

Q) *How can I tell if a product contains coal tar?*

A) To determine if the product has a coal-tar base, look for the Chemical Abstracts Service (CAS) number 65996–93–2 on the product Material Safety Data Sheet (MSDS). The words "coal tar," "refined coal tar," "refined tar," "refined coal-tar pitch," or other similar terms may be listed on the MSDS or on the product container.

Q) *Is sealcoat used on roads?*

A) Use on roads is extremely rare. Occasionally a private property, such as a housing development, will choose to have the roads sealcoated.

Q) *Is use of coal-tar-based sealant regulated?*

A) Several jurisdictions, including the City of Austin, Texas, the City of Washington, D.C., Dane County, Wisconsin, and several suburbs of Minneapolis, Minnesota, have banned use of coal-tar-based sealcoat. Similar bans are under consideration in other jurisdictions.

For more information on USGS research on PAHs and coal-tar-based sealcoat go to *http://tx.usgs.gov/coring/allthingssealcoat.html.*

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Lafayette Publishing Service Center

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—B.J. Mahler and P.C. Van Metre