Klamath
ENVIRONMENTAL
LAW CENTER

RECEIVED
JAN 30 2009
DEPARTMENT OF
COMMUNITY DEVELOPMENT

January 30, 2009

City of Eureka Community Development Department
Ms. Sidnie L. Olson, Principal Planner
531 "K" Street
Eureka, CA 95501-1165

Dear Ms. Olson:

I write on behalf myself and the Mateel Environmental Justice Foundation. The comments herein are in response to the recent circulation of a Draft Environmental Impact Report ("EIR") for the Marina Center Project ("the Project") on the so-called Balloon Track. The Project is to be implemented adjacent to Clark Slough, an arm of Humboldt Bayll surface areas of the Project (as well as all sewage discharge) drain into Humboldt Bay.

Humboldt Bay is one of the premier estuarian resources on the west coast of the United States. It is home to many endangered species, such as the Green Sturgeon, Coho and King Salmon, the Marbled Murrelet. Clark Slough is a Dungeness Crab nursery and provides habitat for numerous species, including Great Blue Heron and River Otters. Humboldt Bay is also the largest mariculture center on the west coast of the United States. As the EIR notes, Humboldt Bay is listed under section 303(d) of the federal Clean Water Act as an impaired water body due to PCB and dioxin contamination. Recent studies have shown that Humboldt Bay oysters can have dioxin levels in them that the federal Environmental Protection Agency ("EPA") considers to be unfit for human consumption. A full description of the biotic resources of the Balloon Track and Clark Slough is included in H.T. Harvey & Associates, *Biotic Chracterization of Clark Slough and "Balloon Track"*, January 2008.[1] In the opinion of these expert biologists, the Northern Harrier, White-tailed Kite, Short-eared Owls, Loggerhead Shrikes, Willow Flycatchers, and Yellow Warblers – all special status avian species – are likely to utilize the habitat provided by the Balloon Track and Clark Slough.

[1] This document has been submitted in electronic form attached to the letter Michelle Smith has submitted on behalf of Humboldt Baykeeper. The electronic attachments to Ms. Smith's letter are incorporated by reference into this letter.

**The Project Description is Inadequate Such that it Provides No Basis for Analysis of Potential Adverse Environmental Effects from Site Remediation**

According to the EIR, the three principle objectives of the Project are: 1.) Strengthen Eureka as the retail and employment center of Humboldt County; 2.) Develop an economically viable mixed use project; and 3.) Facilitate brownfield redevelopment and urban infill development of property in the redevelopment area of the City of Eureka, (EIR at VI-3.) The Project "would include remediation of the brownfield project site to meet federal and state environmental clean up and water quality standards." (EIR at III-2.) In other words, remediation of the site is not simply mitigation of adverse environmental effects from the Project; remediation itself is a key objective of the Project and an integral part of the Project. In spite of site remediation being a critical objective of the Project, and by definition an important part of the Project, the following is the sum total of the EIR's description of this aspect of the project:

> The project would include remdiation of the existing brownfield site to meet federal and state environmental cleanup and water quality standards. This would include preparing a remedial action plan to be approved by the North Coast Regional Water Quality Control Board. The remedial action plan could require the removal of surface vegetation, the removal of contaminated fill materials, and the placement of cleqn soils on the property. (EIR at III-4.)

The EIR's description of the site remediation – an integral, critical component of the Project – is so cursory as to prohibit any meaningful analysis of potential significant adverse environmental impacts of the Project. As such, the EIR fails to set forth specific data, as needed to meaningfully assess whether the proposed activities would result in significant impacts. The evidence that is available demonstrates beyond cavil that soil at the Project site is both extensively and intensively contaminated with a complicated mixture of hazardous chemicals. Soil is contaminated to the extent that groundwater in both the shallower A-Zone and the deeper B-Zone test positive for various toxic hydrocarbons and heavy metals. Moreover, surface run-off from the site is also contaminated with a similar suite of toxic chemicals. Various congeners of highly toxic dioxins and furans (collectively "dioxin") have also been detected in Clark Slough sediment directly beneath the outfall from a ditch that runs across the Balloon Track. The same dioxin has been detected in the soil and sediment of the ditch. Indeed, sampling of the soils at the Balloon Track, Clark Slough Sediments, sampling of fish tissue taken from Clark Slough all test positive for dioxin and furans in every sample tested for these components. Together these data are evidence that dioxin contamination on the site is discharging into Clark Slough, into Humboldt Bay and is being taken into the food chain of greater Humboldt Bay.

As for toxicity of the dioxin that flows from the Project site into Clark Slough and into the Greater Humboldt Bay food chain, the federal EPA has this to say:

> Some of the effects of dioxin and related compounds, such as enzyme induction, changes in hormone levels, and indicators of altered cellular function, have been observed in laboratory animals and humans at or near levels to which people in the general population are exposed. Other effects are detectable only in highly exposed populations, and there may or may not be a likelihood of response in individuals experiencing lower levels of exposure. Evaluation of effects in this health assessment document is based on the concept that lipid-adjusted serum levels approximate the body burden of dioxin and related compounds and that there will be a dose-response relationship between effects and body burden. . . . It is reasonable to assume that developing organisms may be particularly sensitive to adverse impacts from temporary increases above average background exposure levels. . . .
>
> * * *
>
> In TCDD-exposed [dioxin-exposed] men, subtle changes in biochemistry and psysiology, such as enzyme induction, altered levels of circulating reproductive hormones, or reduced glucose tolerance, have been detected in a limited number of available studies. These findings, coupled with knowledge derived from animal experiments, suggest that potential for adverse impacts on human metabolism and developmental and/or reproductive biology and, perhaps, other effects in the range of current human exposures. ***Given the assumption that TEQ intake values represent a valid comparison with TCDD exposure, some of these adverse impacts may be occurring at or within one order of magnitude of average background TEQ intake or body-burden levels (equal to 3-6 to 60 pg TEQ/kg body weight/day or 40-60 to 600 ppt in lipid). As body burdens increase within and above this range, the probability and severity as well s the spectrum of human noncancer effects most likely increase.*** It is not currently possible to state exactly how or at what levels humans in the population will respond, but the margin of exposure (MOE) between background levels and levels where effects are detectable in humans in terms of TEQs is considerably smaller than previously estimated.

In other words, the already abnormally high dioxin levels in Humboldt Bay that render it impaired for these chemicals are exacerbated by any additional dioxin input.

Given the already admitted extensive and intensive and extremely toxic contamination at the Project site, its proximity to Humboldt Bay and Project plans to turn part of the site into residences and to invite thousands of consumers and office workers to visit the site every day, it is clear that an extensive and intrusive site remediation must be done.

As the EIR notes, the Project is proposed to be built on filled tidal marsh that was the site

of a railroad switching, maintenance, and freight yard. Locomotives, railroad boxcars and passenger cars were repaired and refueled at the site. Historically, contamination associated with rail yards as a result of railcar/engine maintenance includes the following:

-- Oil and Grease Removal
-- Painting
-- Locomotive Maintenance
-- Treated Railroad Tie Storage
-- Track Maintenance
-- Site Maintenance (weed removal)
-- Waste Handling, Storage and Disposal

Typically, these activities release the following contaminants:

-- diesel range organics
-- total petroleum hydrocarbons
-- polynuclear aromatic hydrocarbons ("PAHs")
-- volatile organic compounds ("VOCs") including spent solvents
-- heavy metals – antimony, arsenic, beryllium, cadmium, chromium (hexavalent and total), copper, lead, mercury, nickel, selenium, silver, thallium and zinc
-- herbicide residuals, including 2,4-D, 2,4,5-T and their contaminants, which include dioxins and furans.

All of these typical contaminants have been detected at the Balloon Track site. In 2002, approximately 700 cubic yards (70 dump truck loads) of hazardous waste (lead and copper-contaminated soil) were removed from one part of the site. Substantial residual contamination remains at the site. Of 241 investigative soil samples taken at the site, there were 124 exceedances of USEPA Region 9 Preliminary Soil Remediation Goals ("PRGs") for arsenic and 19 exceedences for lead. The Project plans to build residences on the site. Since the most protective PRGs are for residential use, all of these constitute exceedences of residential PRGs.

According to Dr. Benjamin Ross, groundwater at the Project's site is also heavily contaminated with these chemicals, indicating that the soil is contaminated to some depth. Monitoring Well 2A ("MW-2A") is located along the western portion of the site and is hydraulically downgradient of a number of the samples exceeding impact to groundwater criteria. Concentrations of arsenic in 8 of 14 shallow groundwater samples collected from MW-2A exceeded the groundwater Water Quality Objective ("WQO") of 0.1 micrograms per liter ("0.1 µg/L"). [2] This shows a potential completed pathway for arsenic soils to impact groundwater and

---

[2] Draft Final Remedial Action Plan UPRR Eureka Rail Yard and Adjacent Lease Properties Eureka, California, MFG, Inc., July 1, 2005.

migrate to Humboldt Bay. In addition, and once again according to Dr. Ross, groundwater from the northern portion of the northeastern portion of the site, which contains numerous samples with arsenic concentrations above the impact to groundwater criteria, flows to Humboldt Bay.[3] As to lead, of the 241 investigation soil samples analyzed, 28 exceeded the residential PRG of 150 mg/kg. Soil samples collected at the site also show residential PRG exceedences for antimony, copper, iron, tetrachloroethalene ("PCE"), and PAHs.

Enough is known about the toxic profile of the site to make it clear that large amounts of soil will have to be removed from the site and trucked away. Yet, in spite of the many samples that have already been taken and analyzed, the site is in no way characterized in a way that would be sufficient to determine what kind of remediation would be sufficient. For example, the pipe at the property line of the site and the Del-Reka Distributing Corporation receives discharge from the southeastern ditch and discharges off-site. This discharge was never addressed in the currently existing Cleanup and Abatement Order ("CAO") nor has it ever been sampled by the Project proponents. Thus the water from this discharge location has never been characterized. Site groundwater enters the southeastern ditch from the Site and mingles with stormwater and surface water from the Site before discharging from the Site vi the pipe at Del-Reka Distributing Corporation. There are no monitoring wells that intercept this groundwater flow. Thus, there exists a data gap that prevents determination of pollutant concentrations in the groundwater entering the ditch directly and through discharge from the wetland. The EIR itself, at page IV G-6 admits that, "Recent sediment samples have identified dioxins, furans and PCBs in onsite ditches and in Clark Slough. The sources of these substances have not been identified."

Given that there is massive and highly toxic contamination at the site, that highly toxic chemicals are leaving the site, and the obvious need for an extensive clean-up, the EIR provides next to no information about this aspect of the project. The EIR states that the Project proponent plans to conduct a RWQCB-approved Site remediation. (EIR at IV.G-19.) Once approved, the soil and groundwater management aspects of the remediation component of the Project will finally be described. (*Ibid.*) This description will finally include information about those aspects of the Project that will keep toxic chemicals on-site after completion of the Project. (*Ibid.*) This puts the cart precisely before the horse. What the Project proponent seeks is to gain approval of the Project and then, after approval, finally describe what will be one of the principal components of the project and, at that (too) late date, finally conduct whatever analysis the Project proponent does. This remediation component of the project – and whatever mitigations are associated with it – may or may not mitigate adverse environmental impacts from the Project, but there is no way to make that determination now, at the pre-approval stage of the project. Any analysis of the site remediation component of the Project will thus be no more than a post-hoc rationalization. And by refusing to provide any meaningful description of this critical, environmental effect-laden

---

[3] Benjamin Ross, PhD, Ground-Water Movement at the Balloon Tack Site, Eureka, California, January 28, 2008.

portion of the Project, both agency decision makers and the interested public are deprived of any meaningful ability to review and comment on this the Project. CEQA does not permit an EIR to leave decision makers and the interested public to search outside the EIR for facts and analysis about the Project as if they were pigs rooting for truffles.

There is thus no information available to decision makers about whether soil will be removed from the site, how much soil will be removed from the site, how toxically contaminated that soil will be and thus where it will have to be taken. Decision makers and the public have no information about how many dump truck loads of soil will be carted from the site, where they will go. There is no information whatsoever in the EIR about the environmental effects of trucking soil, what the effect will be on air quality, how likely fugitive spills of contaminated soil will occur, what the effect will be on traffic. The public is given no information in the EIR about whether the site remediation aspect of the Project might include on-site incineration or on-site thermal desorption of hazardous waste. Decision makers and the public are thus deprived of any chance to understand what effects there may be on air quality from excavation of soil and/or incineration and/or thermal desorption of the toxins. The EIR provides no useful information whatsoever that would be of use in analyzing these potential activities for potential adverse environmental effects. The EIR provides no meaningful description of what toxic chemicals will be left at the site after completion of the (completely undescribed) remediation portion of the Project.

The EIR provides no information as to what concentrations there will be of these left-behind chemicals or where or at what depths or proximity to ground water they will be left. Decision makers and the public are thus given no meaningful analysis of potential environmental effects could result from this aspect of the Project. The EIR states that the project will create a "wetland reserve" of 11.89 acres, which will include restoration of the wetland enclosing Clark Slough. (EIR at III-14.) As discussed above, sediment in Clark Slough is already contaminated with dioxin and all available evidence points to the Project site itself as a source of at least some of this dioxin. There will be pedestrian paths along portions of the wetland reserve area. (*Ibid.*) Residences will be constructed nearby. These wetlands will be used as habitat by many of the aquatic and avian species discussed above. Failure to disclose the extent of the site remediation component of the project thus makes it impossible to analyze how the toxic chemicals left behind will affext the public and the wildlife that will be hiking near or using the wetland parts of the Project.

The EIR provides no information as to how long the remediation aspect of the Project will take. There is a currently a CAO pertaining to the Project site that has been in effect since 2001. The responsible parties have still not complied with that CAO. As part of my legal practice, I have reviewed the files of many site remediations conducted using the RWQCB as the lead agency. These remediations typically take years if not decades. For example, at the old Simpson Plywood Mill site at the corner of Waterfront Drive and Del Norte Street (the old Flea

Mart), the Regional Board began investigating that site in 1991. In July of 1995 RWQCB staff were already discussing with the land owner and Simpson potential methods to remediate soil and groundwater contamination at that site. As of the writing of this letter, more than thirteen years later – and after thousands of cubic yards of soil have been dug up and trucked away from the site and after acres of asphalt has been laid to "cap" contamination, thousands of cubic yards of highly contaminated soil still remain uncleaned up at the site. As of the writing of this letter, the RWQCB still has no idea when it will give a final sign-off on clean up at the old Simpson Plywood Mill site. My point is simply that these clean ups can take decades – as the one at the Balloon Track site seems to have already taken -- and the Balloon Track EIR gives no meaningful information about how long the remediation will take and thus how long dioxin will continue to spill off the site into Clark Slough during the duration of the remediation, how long groundwater contaminated with arsenic, lead, antimony, copper, petroleum hydrocarbons and trichloroethylene will continue to make its way into Clark Slough and into Humboldt Bay. Decision makers and the public thus has no way to analyze potential environmental effects of this critical component of the Project.

At a very minimum, the Project proponent should have to provide an adequate projecxt description. This would require that the Project proponent have a RWQCB-approved work plan for final remediation of the site and this RWQCB-approved work plan should be incorporated into the EIR as at least part of the description of the site remediation aspect of the Project.

**The EIR Fails to Analyze for Potentially Significant Adverse Environmental Effects and Fails to Describe Feasible Mitigations for those Potential Significant Adverse Environmental Effects.**

For the reasons discussed above, the almost completely missing description of the site remediation aspect of the Project means that there is virtually no meaningful analysis of any potentially significant adverse environmental effects of the site remediation portion of the Project. The EIR's cursory attempt to discuss potential mitigations suffers from many of the same shortcomings. As mitigation for potential exposures of humans and wildlife to the complex toxic coctail at the site during the remediation aspect of the Project, the EIR simply notes that it will engage in a RWQCB-approved site remediation, and will do the following to mitigate:

> Mitigation Measure G-1a: The project applicant will prepare a site-specific remediation plan and health and safety plan that meets the requirements of the Regional Water Quality Control Board (RWQCB) or other overseeing agency and shall comply with all federal and state regulations including Occupational Safety and Health Administration (OSHA) requirements for worker safety. Applicable regulations and methods of compliance shall depend upon the level of contamination discovered.

In other words, the EIR says that the Project proponent will comply with all applicable laws and that, therefore, all potentially significant adverse environmental effects (whatever those un-described and unanalyzed potential effects are) will be mitigated to insignificant levels. This is a fatuous statement. By the EIR's logic, since there are laws and regulations in place everywhere, there can be no potentially significant adverse environmental effects anywhere from anything. If this approach were taken seriously, there would be no need for any EIR for any project, since any project proponent could simply say that a Mitigated Negative Declaration is appropriate since all applicable laws will be followed and, thus, there can be no potentially significant adverse environmental effects from any project. The falseness of the EIR's obtuse approach is evidenced by the EIR itself which, though it notes that it will comply with all applicable laws and regulations, still concedes that there will be unmitigated, significant adverse effects to air quality.

There is nothing in the Water Code, nor in any State or Regional Water Board regulation that mandates that a RWQCB-approved clean up neither cause nor result in significant adverse environmental effects. Some RWQCB-approved clean ups have required that tens of thousands of cubic yards of highly contaminated soil be dug up and trucked to places as far away as Idaho. The simple act of excavating and hauling that much material would have potentially significant adverse environmental effects to traffic and air quality. The EIR's reliance on the Project proponent's willingness to "follow the law" and the requirements of unnamed "oversight agencies", though laudable, when proposed as a catch-all mitigation for potential adverse effects of remediation, is risible.

**Adverse Effects of Stormwater Runoff from the Project are not Adequately Mitigated**

The EIR projects that there will be an additional 15,666 weekday trips on area roads caused by the project. (EIR at IV.O-21.) This increase in traffic near the Project site will result in unmitigated adverse impacts to local air quality. (EIR at IV.C-12.) These increased vehicle trips will cause a corresponding parallel and linearly-related increase in adverse impacts to water resources from toxic emissions from these vehicles. Vehicles emit, among other parameters, used motor oil, coolant, tire-dust and gasoline. Monitoring at the site shows that dissolved copper, lead and zinc at levels exceeding water quality objectives.[4] In addition, the EIR states that the Project will use asphalt to pave a parking lot large enough for more than 1,800 vehicles. Attached is a US Geological Survey Report on polycyclic aromatic hydrocarbon run-off caused by asphalt. To mitigate for the already existing toxic run-off and any increase in toxic run-off, the EIR proposes to, "treat stormwater at drop inlets that capture runoff from roof drains, paved pedestrian areas, and parking, prior to connection to the City's storm drain system. The project proponent shall prepare and implement a permanent maintenance program for stormwater

---

[4] *Expert Report of Bruce A. Bell, PhD., In the Matter of Humboldt Baykeeper and Ecological Rights Foundation v. Union Pacific Railroad Company, et al.*, January 27, 2008.

treatment facilities at the site." (EIR at IV.H-20.) First, the EIR admits that the Project will cause significant increases in the concentration of vehicles on city streets in the vicinity of the project. This will cause a corresponding increase in the amount of motor oil, tire particles, coolant and gasoline that are deposited on the streets in the vicinity of the Project site and, thus, an increase in the concentration of those toxic constituents in the stormwater runoff that enters drop inlets to the city storm drain system in the area near, but not on, the Project site. The stormwater mitigation in the EIR – to treat water that enters drop inlets on site in no way mitigates the increased concentration in these pollutants in the storm drain system via storm sewer inlets on the streets near but outside the Project site. There isn't even any analysis of this issue in the EIR. Second, the EIR does not specify how stormwater will be treated at the drop inlets on-site. This is problematic, since typical drop inlet stormwater treatment consists of oil-water separators and, perhaps, sand filters. This treatment system may, perhaps, be adequate to remove separate phase hydrocarbons and particulates, but this type of treatment is completely ineffective at removing dissolved phase metals, hydrocarbons and miscible pollutants such as coolant. A filtration system that utilizes carbon filters could, possibly, remove dissolved phase pollutants, but that method is not specified in the EIR. The EIR therefore does not provide adequate information to determine whether the on-site stormwater treatment will adequately mitigate for dissolved phase pollutants.

Thank you for considering these comments.

Cordially,

William Verick

Attachment

# Frequently Asked Questions —Parking-Lot Sealcoat: A Major Source of PAHs in Urban and Suburban Environments

Back to "Parking-Lot Sealcoat: A Major Source of PAHs in Urban and Suburban Environments"



## What are PAHs, coal tar, and sealcoat? (top of page)

Polycyclic aromatic hydrocarbons (or PAHs) are a group of organic contaminants that form from the incomplete combustion of hydrocarbons, such as coal. Coal tar is a byproduct of the coking of coal, and can contain 50 percent or more PAHs by weight.

Sealcoat is a black liquid that is sprayed or painted on asphalt pavement in an effort to protect and beautify the asphalt. Most sealcoat products are coal-tar or asphalt based. Many coal-tar sealcoat products contain as much as 30 percent coal tar by weight.

## Where is sealcoat used? (top of page)

Sealcoat is used commercially and by homeowners across the Nation. It commonly is applied to parking lots associated with commercial businesses (including strip malls and shopping centers); apartment and condominium complexes; churches, schools, and business parks; and on residential driveways. The City of Austin, Texas, estimates that about 600,000 gallons of sealcoat are

applied every year in the city.

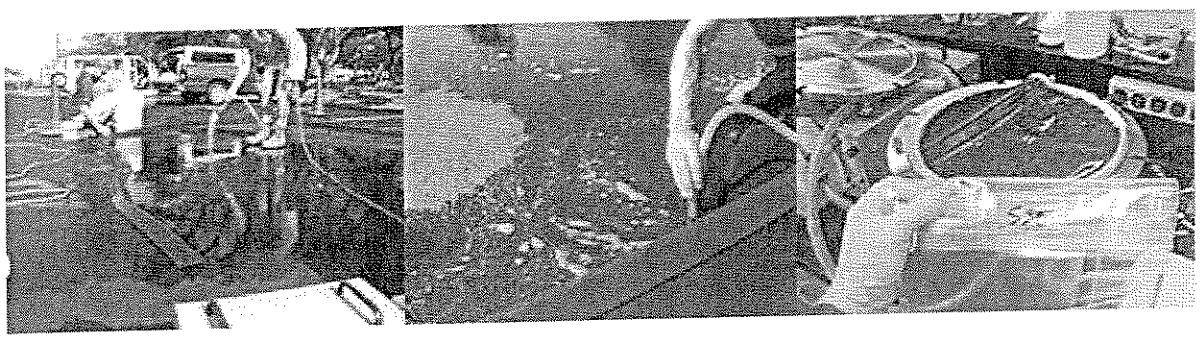
Two kinds of sealcoat products are widely used: coal-tar-emulsion based products and asphalt-emulsion based products. National use numbers are not available; however, it has been suggested that asphalt-based sealcoat is more commonly used on the West Coast and coal-tar based sealcoat is more commonly used in the Midwest, the South, and on the East Coast.

How does sealcoat get from parking lots into the environment? (top of page)

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

How did the USGS study parking-lot runoff? (top of page)

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



What concentrations of PAHs wash off sealed and unsealed parking lots? (top of page)

The NAWQA study found that concentrations of PAHs were much higher in runoff

from parking lots sealed with coal-tar based sealcoat than from all other types of parking-lot surfaces. The average concentration in runoff from coal-tar sealed lots was 3,500 mg/kg, about 65 times higher than the average concentration in particles washed off parking lots that had not been sealcoated (54 mg/kg). The average concentration in particles washed off parking lots sealed with asphalt-based sealcoat was 620 mg/kg, about 6 times less than coal-tar based sealcoat, but still 10 times higher than the concentration from unsealed parking lots (Mahler and others, 2005, Parking Lot Sealcoat: An Unrecognized Source of Urban Polycyclic Aromatic Hydrocarbons: Environmental Science & Technology, v. 39, p. 5560-5566)

Runoff from all parking lots is contaminated with PAHs from leaking motor oil, tire particles, vehicle exhaust, and atmospheric deposition, and therefore, it is not surprising that the concentrations of PAHs in particles washed off each of the different surface types exceeded a widely used consensus-based sediment-quality guideline of 22.8 milligrams per kilogram (mg/kg). This sediment-quality guideline, known as the Probable Effect Concentration (PEC) represents the concentration of a contaminant in bed sediment expected to adversely affect benthic, or bottom-dwelling, biota. However, the large differences between concentrations for the sealed and unsealed parking lots indicate that abraded sealcoat is a potentially important (and previously unrecognized) contributor to PAH contamination in urban and suburban water bodies.

How do PAHs from sealcoat impact streams? (top of page)

The USGS assessed connections between PAHs in particles washed from sealed parking lots and PAHs in suspended sediment in four streams in Austin and Fort Worth, Texas. Findings showed that PAHs in suspended sediments in the streams were chemically similar to those in runoff from parking lots sealed with coal-tar based sealcoat. Analysis of the total mass of PAHs expected to wash off sealed parking lots and the total mass of PAHs measured in suspended sediments in the streams after rainstorms indicated that runoff from sealed parking lots could account for the majority of PAH loads to the streams.

Both unsealed and sealed parking lots receive PAHs from the same urban sources—tire particles, leaking motor oil, vehicle exhaust, and atmospheric deposition—yet the average yield of PAHs from sealed parking lots is 50 times greater than that from unsealed lots. What would be the effect on PAH loading to the streams if parking lots were not sealed? Estimates from the USGS study indicate that total loads of PAHs coming from parking lots in the studied watersheds would be reduced to about one-tenth of their current loads if all of the parking lots were unsealed.

City of Austin biologists are conducting studies to evaluate the effects of sealcoated parking lots on aquatic communities in area streams. These studies include toxicity testing (exposing single test organisms to sediments spiked with coal-tar and asphalt-based sealcoat) and evaluations of aquatic communities in streams upstream and downstream from inflows of runoff from sealed parking

lots.

What are the environmental and human-health concerns? (top of page)

PAHs found in sealcoat and other combustion-based materials are toxic to mammals (including humans), birds, fish, amphibians, invertebrates, and plants. PAHs tend to attach to sediments; possible effects of PAHs on aquatic invertebrates include inhibited reproduction, delayed emergence, sediment avoidance, and mortality. The Probable Effect Concentration (PEC) for total PAH, a widely used sediment-quality guideline for the concentration of a contaminant in bed sediment expected to adversely affect benthic (or bottom-dwelling) biota, is 22.8 milligrams per kilogram (mg/kg). Possible adverse effects on fish include fin erosion, liver abnormalities, cataracts, and immune system impairments. For more information on toxicity of PAHs to biological organisms, see http://www.epa.gov/R5Super/ecology/html/toxprofiles.htm#pahs.

The USGS study did not evaluate human-health risk from exposure to sealcoat. Human-health risk from environmental contaminants is often evaluated in terms of exposure pathways. For example, people could potentially be exposed to PAHs in sealcoat through skin contact with abraded particles from parking lots, inhalation of wind-blown particles, and inhalation of fumes that volatilize from sealed parking lots. PAHs in streams and lakes rarely pose a human-health risk via drinking water because of their tendency to attach to sediment rather than dissolve in water. In addition, because PAHs do not readily bioaccumulate within the food chain, possible human-health risks associated with consumption of fish are low. For more information on PAH exposure, see *http://www.atsdr.cdc.gov /toxprofiles/phs69.html*.

What are the implications of the findings? (top of page)

The study of parking-lot surfaces by the USGS and the City of Austin has implications that extend beyond Texas as parking-lot sealants are used nationwide. Findings suggest that abraded sealcoat has the potential to be an important source of PAHs in urban and suburban water bodies. In the past, sources of PAHs in urban watersheds have been thought to be dominated by leaking motor oil, tire wear, vehicular exhaust and atmospheric deposition. This study may thereby influence the discussion of strategies for controlling PAHs in urban environments.

Accessibility FOIA Privacy Policies and Notices

U.S. Department of the Interior | U.S. Geological Survey
URL: http://water.usgs.gov/nawqa/pah_faq.html
Page Contact Information: nawqa_whq@usgs.gov
Page Last Modified: Tuesday, 28-Aug-2007 10:36:54 EDT