PAVEMENT COATINGS TECHNOLOGY COUNCIL

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April 16, 2014

Information Quality Guidelines Staff
Ronald Reagan Building
Room M1200
1300 Pennsylvania Ave., N.W.
Washington, DC 20460

Via E-Mail: quality@epa.gov

Re: Request for Correction under the EPA Information Quality Guidelines

Publications: EPA CADDIS Volume 2: Sources, Stressors & Responses – Pavement Sealant & PAHs (EPA Publication #1)
http://www.epa.gov/caddis/ssr_urb_wsq4.html
http://www.epa.gov/caddis/ssr_urb_ref.html

EPA Stormwater Best Management Practice (EPA Publication #2)
"Coal-Tar Sealcoat, Polycyclic Aromatic Hydrocarbons, and Stormwater Pollution"
http://www.epa.gov/npdes/pubs/coaltar.pdf

Dear Sir or Madam:

On behalf of the Pavement Coatings Technology Council (PCTC), which represents numerous companies throughout the country that are part of the sealcoat industry, I write to submit a Request for Correction of information contained within the publications cited above that have been posted by the U.S. Environmental Protection Agency (EPA). This request is made pursuant to the EPA Information Quality Guidelines[1] and the Office of Management and Budget (67 F.R. 8452) in accordance with Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554).

[1] *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by EPA*, October, 2002;
http://www.epa.gov/quality/informationguidelines/documents/EPA_InfoQualityGuidelines.pdf

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INFORMATION REQUIRING CORRECTION – OVERVIEW

As part of a long standing campaign, certain individuals within the United States Geological Survey (USGS) and the City of Austin (COA), Texas, have used their government positions to persuade consumers, legislators, the press and even other government agencies to adopt their goal of banning the use of refined coal tar-based pavement sealants (RTS) across the country. All too often, this campaign has side stepped sound scientific methodology, upon which the vast majority of government scientists pride themselves, and has relied instead on a collection of questionably executed "studies" and press releases in which contrary scientific views are ignored, data are selectively used or withheld without explanation, methodology flaws are overlooked, and perhaps most disturbing, hypotheses are presented as undisputed facts.[2] The EPA has contributed to this flawed process by citing in the documents needing correction several of these studies without first conducting any type of critical review, at least none that has been apparent to the public.

The most obvious flaw in the EPA's approach to the RTS debate is that peer reviewed articles and studies which directly challenge the USGS and COA findings have been ignored. The EPA publications cited above, and examined in greater detail below, are examples of this breakdown in sound scientific methodology. Additionally, the USGS and EPA have been careful to proceed in such a way that neither has been required to hold a single hearing or public comment period that would subject to public scrutiny the USGS' underlying research or decisions made by EPA based on USGS research. In short, USGS strategies to phase out RTS largely have been developed behind closed doors, apparently by a small group of like-minded individuals, who share a common agenda. While such a process may be consistent with "politics as usual," it certainly is not consistent with sound science or government transparency.

Such tactics, instead, are consistent with a flaw that is becoming more and more evident, particularly in the field of government research and policy making. That flaw is known as "White Hat Bias," which has been defined in the scientific literature as "bias leading to the distortion of information in the service of what may be perceived to be righteous ends."[3] The potential for White Hat Bias certainly escalates when "new" discoveries are being pursued that carry with them favorable press attention, monetary grants and notoriety. With respect to the assessment of RTS by the USGS and EPA, the conspicuous absence of any citation of peer reviewed research that happens to be funded by industry should be a clear warning sign that

[2] Three DQA challenges have been filed against the USGS and its coal tar sealant publications over the past 10 months. The first challenge, filed on May 15, 2013, focused on the USGS' 40 Lakes Paper in which the USGS claimed, mistakenly, that coal tar sealants had been shown to be the primary source of PAH contamination in lakes east of the Continental Divide. The 40 Lakes Paper will be evaluated in greater detail below since it is cited by the EPA. The 2nd DQA challenge, filed on May 31, 2013, focused on the USGS' inappropriate use of catfish tumor photos to frighten the public into considering coal tar sealant bans. The third challenge, filed on September 18, 2013, analyzed in detail a flawed RTS risk assessment conducted by the USGS and a toxicologist from Baylor. The three USGS DQA challenges, which should be reviewed by the EPA before responding to this Request for Correction, may be found at the following USGS websites: http://www.usgs.gov/info_qual/coal_tar_sealants.html and http://www.usgs.gov/info_qual/cancer_risk_coal-tar-sealed_pavement.html

[3] Cope,M and Allison, D, "White Hat Bias: Examples of Its Presence in Obesity research and a Call for Renewed Commitment to Faithfulness in Research Reporting," Int J Obes (Lond); 34 (1): 84-88; January, 2010.; http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2815336/

some sort of bias may be at play. EPA Guidelines, of course, dictate that all reasonable efforts be made to guard against bias in EPA publications. When these efforts fail, corrections must be made. Any failure to take such action will continue to adversely affect those members of the PCTC who distribute or apply RTS because consumers and legislators who are being asked to consider the merits of proposed sealant bans or restrictions are being misled by the EPA publications cited above.

EPA INFORMATION QUALITY GUIDELINES

The OMB Guidelines require that EPA data collection and research activities be "carried out in a consistent, objective, and replicable manner" aimed at ensuring the objectivity, utility, and integrity of information disseminated to the public.[4] To be "objective," information published by the EPA must be presented in an "accurate, clear, complete, and unbiased manner."[5] "Objectivity" also requires that original and supporting data be produced and that sound statistical and research methods be followed.[6]

In developing its own Guidelines, the EPA adopted the quality principles in the Safe Drinking Water Act Amendments ("SDWA") of 1996 which remind staff and scientists that accurate, reliable and unbiased information involves the use of:

> (i) the best available science and supporting studies conducted in accordance with sound and objective scientific practices, including, when available, peer reviewed science and supporting studies.[7]

The EPA Guidelines specifically apply to "information" that the EPA disseminates to the public and generally includes any communication or representation of knowledge, such as facts or data, in any medium or form. Preliminary information disseminated to the public by the EPA is also covered by the Guidelines, as are materials that the EPA posts on its web pages.[8] Thus, the EPA publications for which corrections are being requested above clearly fall within the scope of both the OMB and EPA Information Quality Guidelines.

It should be noted that for influential scientific information (the USGS/EPA assessment of RTS clearly falls into this category), the EPA requires a "higher degree of transparency about data and methods" which "facilitate the reproducibility of such information by qualified third parties."[9] "Reproducibility" means that "independent analysis of the original or supporting data using identical methods would generate similar analytic results." When evaluating environmental issues and risk assessments, the EPA must apply a "weight-of-the-evidence approach that considers all relevant information and its quality, consistent with the level of effort

[4] *See* USGS Guidelines, Section III; Office of Management and Budget ("OMB") Guidelines, 67 F.R. 8452, 8459 (February 22, 2002); *see also* EPA Information Quality Guidelines, Section 5.1 (October 2002).
[5] *Id.*
[6] USGS Guidelines, 67 F.R. 8452, 8459.
[7] EPA Guidelines, p. 22
[8] *Id.*, p. 15
[9] *Id.*, p. 20

and complexity of detail appropriate to a particular risk assessment."[10] As will be demonstrated below, these standards and guidelines have been overlooked when it comes to RTS.

ASSESSING THE IMPACT OF PAHS ON THE ENVIRONMENT

Many scientists note that contamination of urban lakes and streams by polycyclic aromatic hydrocarbons (PAHs) is widespread in the U.S.[11] The wide spread occurrence of PAHs is not particularly surprising since there is a consensus in the scientific community that PAHs have many potential sources, including vehicle emissions, motor oil, crude oil, power plant emissions, tire particles and industrial releases. Indeed, almost any type of combustion of organic matter will produce PAHs as a by-product, including natural sources such as forest fires and volcanoes. Indeed, PAHs have been around since the beginning of the Earth and are considered possible starting material for the earliest forms of life.[12] Thus, one would expect PAHs to be ubiquitous in our environment and, in fact, they are. Our earliest ancestors generated PAHs. If there was a fire that offered them warmth or light, or cooked their food, PAHs were present. Most of us continue with similar activities today when we grill on the backyard barbecue or throw a few logs into the fireplace.

Given the billions of years that PAHs have been present, one may wonder why the Earth is not overwhelmed by PAHs. The answer is rather basic. PAHs degrade naturally in variety of different ways such as through oxidation, photolysis and biodegradation by microorganisms.[13] PAHs are actually a food source for certain types of organisms. In the atmosphere, it has been reported that benzo(a)pyrene absorbed onto soot is readily photo oxidized, with 60% destroyed within the first 40 minutes of exposure to sunlight.[14] The rate and extent of biodegradation of PAHs in soil are affected by environmental factors such as temperature, pH, oxygen concentration, PAH concentrations and contamination history of soil, soil type, moisture and nutrients. Scientists have observed the half-life of PAHs in soil to range from a few days to several hundred days. In sediment, PAH transformation also takes place, although rates can sometimes be longer than those observed in soil.[15]

According to the Agency for Toxic Substances and Disease Registry (ATSDR), most direct releases of PAHs to the environment are to the atmosphere from both natural and anthropogenic sources, with emissions from human activities predominating.[16] Even with respect to surface waters, most of the PAHs are believed to result from atmospheric deposition.[17] It has been estimated that a total of 11,031 metric tons of PAHs are released to the atmosphere in the United States on an annual basis, with 36% of the total coming from residential heating, 6% from industrial processes, 1% from incineration, 36% from open burning, 1% from power generation,

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[10] *Id*., p. 21
[11] Van Metre, P. C.; Mahler, B. J., Contribution of PAHs from Coal-Tar Pavement Sealcoat and Other Sources to 40 U.S. Lakes. Sci. of the Total Environ., 2010, v.409, 334-344.
[12] Allamandola, Louis et al. (April 13, 2011); "Cosmic Distribution of Chemical Complexity". *NASA;* http://amesteam.arc.nasa.gov/Research/cosmic.html
[13] ATSDR Toxicological Profile for Polycyclic Aromatic Hydrocarbons, Aug. 1995, pp. 246-54.
[14] *Id*., pp. 247-48.
[15] *Id*., pp. 252-54.
[16] *Id*., p. 230.
[17] *Id*., p. 235

and 21% from mobile sources.[18] This must be contrasted to the amount of RTS that has been estimated to abrade off of asphalt surfaces in a given year. According to the EPA, this number could be 160 metric tons[19], which we believe to be an elevated estimate, but even still is only 1.5% of the total PAH emissions mentioned above.

Most government agencies, including the EPA, agree that PAHs have a multitude of sources and are ubiquitous, not only throughout the United States, but throughout the world. Seen in the context of the array of possible sources, any attempt to determine the extent to which RTS may have contributed to PAHs found in a given environment, if at all, is bound to require a complex set of analyses that cross over into different scientific disciplines. For example, a scientist with an expertise in field sampling (*e.g.*, water, soil and sediment) may have little expertise at collecting PAH dust samples within homes, and even less expertise when it comes to applying sophisticated "fingerprinting" models to analytical results, such as those used in the specialty discipline of chemical forensics. Given the multidisciplinary areas of expertise involved in evaluating sources of and exposures to PAHs, questions about expertise should be asked. This is particularly true when a small group of government scientists, none with fields of primary expertise involving either PAHs source identification or source apportionment, appear to have influenced and/or published virtually all of the "relevant" articles on RTS. The need for questioning jumps to another level once it becomes evident that this same group has also failed to consider seminal publications in relevant disciplines, industry-sponsored research, and research conducted by the same or sister government agencies that might suggest contrary conclusions. Such circumstances are yet another warning sign that something may be amiss.

As an agency, the EPA is certainly familiar with what goes into a proper scientific evaluation of how certain chemicals, products or industrial processes may impact the environment. Hypotheses must be tested and retested using scientifically and statistically sound sampling techniques. To the extent possible, confounding factors and variables must be controlled, and when that is not possible, study limitations must be clearly expressed in order to avoid misleading policy makers and the public regarding the significance of any initial findings. And of course, critical and independent review is to be encouraged and brought to light, not ignored or suppressed. Many in the scientific community should be involved, not just a few who belong to an affinity group and have a great deal of personal and professional prestige at stake. Proper science and robust public policy demand nothing less.

Yet, when it comes to RTS, the EPA seems to have side stepped its own evaluation criteria. The web publications that are the focus of this Request for Correction make it appear as though the EPA has already determined that RTS adversely impacts human health and the environment and therefore should be banned or voluntarily phased out. As will be demonstrated below, the evidence cited by the EPA in support of this proposition is, at best, preliminary and incomplete, and at worst, a classic example of White Hat Bias. Either way, the EPA publications are misleading and must be corrected. It is ironic that the first EPA web publication addressed in detail below can be found on the EPA's CADDIS website, which emphasizes how important it is

[18] *Id.*, p. 232
[19] EPA, Assessment of Water Quality of Run-Off From Sealed Asphalt Surfaces, EPA/600/R-10/178, September 2011, p. 4; http://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100ECC8.txt

to consider all relevant evidence when performing an environmental causation analysis.

THE EPA'S CADDIS SYSTEM – GENERAL PRINCIPLES

The Causal Analysis/Diagnosis Decision Information System, or CADDIS, is an EPA initiative developed to help scientists and engineers in the Regions, States, and Tribes conduct causal assessments in aquatic systems. The primary question to be addressed using CADDIS is "How can environmental assessors and managers determine the causes of environmental impairments?" The EPA recognizes the difficulty in answering this question because ecosystems are complex and environmental evidence is diverse.[20] CADDIS users are guided through the evaluation process via a website and guidance documents.

The importance of considering all relevant evidence and weighing it is emphasized throughout the CADDIS website, as demonstrated below:

> **Weighing of evidence**: We believe that all relevant evidence should be considered. Evidence comes from diverse sources of information such as observations at the site, regional monitoring studies, environmental manipulations, laboratory experiments, and general scientific knowledge. Information may come from the literature or may be generated *ad hoc*. Evidence may be generated from information by various methods including interpretation of reported observations, summary statistics, statistical modeling, and mathematical modeling.[21]

Scientists and engineers are further encouraged to consider the manner in which certain types of evidence may not be reliable because of a lack of data, poor quality data, a poorly defined impairment, or multiple causes.[22]

Perhaps most important, the philosophy behind CADDIS acknowledges that decision makers and stakeholders, such as the PCTC, should be viewed as part of the extended team engaged to investigate the cause of aquatic system impairment. As an agency with regulatory responsibilities, the EPA understands that industry provides important insights and often knows about historical impacts that may have become hidden by a changing landscape. Stakeholders also may have collected other types of relevant data over the years. The EPA uses all sorts of information provided by industry on a routine basis to accomplish its regulatory mission, so it is with insight gained from experience that CADDIS instructs the users of its website to "involve your stakeholders and decision-makers often."[23] For reasons that have never been expressed, the PCTC and its members have been excluded by the EPA from the process of evaluating the aquatic impacts of RTS, if any.

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[20] http://www.epa.gov/caddis/si_approach.html
[21] *Id.*
[22] *Id.*
[23] *Id.*

CADDIS - PAVEMENT SEALANTS & PAHs (EPA Publication #1)

Volume 2 of the CADDIS evaluation process deals with Sources, Stressors and Responses. This volume provides background information on many common sources, stressors, and biotic responses in stream ecosystems. According to CADDIS, urbanization is an increasingly pervasive land cover transformation that significantly alters the physical, chemical and biological environment within surface waters. The CADDIS website presents a diagram which identifies a multitude of pathways through which urbanization may affect stream ecosystems. That diagram is attached as Exhibit A.[24]

At the bottom left corner of the diagram is a pathway heading entitled "Water/Sediment Quality," and within it is a sub-heading called "Pavement Sealants." Users of the EPA's CADDIS system are encouraged to click onto the Pavement Sealants subheading in order to obtain more detailed information regarding this specific topic. The link leads to a webpage titled "Pavement Sealants and PAHS." A copy of this webpage is attached as Exhibit B. It is one of the EPA postings that clearly requires correction pursuant to the EPA's Information Quality Guidelines, not to mention the standards of the CADDIS system of causation analysis.

Exhibit B includes a prominently displayed picture of a sealed parking lot. Two seal coat studies are cited immediately below the parking lot photo. The first is a 2005 article authored by USGS scientist Barbara Mahler and others entitled "Parking Lot Sealcoat: An Unrecognized Source of Urban Polycyclic Aromatic Hydrocarbons."[25] This particular article was referenced for its observation (based on a small data set) that PAH concentrations in run-off from several RTS coated parking lots reportedly were 65 times higher than run-off from unsealed parking lots. The second article was published by COA staff scientist Mateo Scoggins and others in 2007 and is titled "Occurrence of Polycyclic Aromatic Hydrocarbons Below Coal Tar Sealed Parking Lots and Effects on Stream Benthic Macroinvertebrate Communities."[26] Although this study was cited for several propositions, it was initially mentioned for its finding that PAH concentrations in stream sediments were significantly higher downstream of coal tar sealed parking lots versus upstream sites. Evidently, Mahler et al. (2005) and Scoggins et al. (2007) were cited together by the EPA to create the mistaken impression that PAHs from RTS sealed parking lots must be to blame for several downstream PAH "hotspots" in COA streams.[27]

Before examining in greater detail below the flaws inherent within Mahler et al. (2005) and Scoggins et al. (2007), it is important to recognize that these two papers are outgrowths of attempts to provide justification for the COA banning the sale and use of RTS within city limits. As will be further explored below, Austin had sought the opinion of and been assured by the Texas Commission on Environmental Quality (TCEQ), the Texas Department of Health (TDH) and the U.S. Environmental Protection Agency (EPA) that pollutants in sediments in Barton Springs were present at such low levels that they posed no threat to either swimmers or the

[24] http://www.epa.gov/caddis/ssr_urb_intro.html
[25] Environ. Sci. Technol., 2005, Vol. 39, pp 5560-5566.
[26] Journal of the North American Benthological Society, 2007, Vol. 26(4): 694-707.
[27] Scoggins et al. (2007) was *not* cited for its finding that, contrary to Mahler et al. (2005), a relationship between the PAH signature of RTS and that of Austin area stream sediments could *not* be identified.

endangered Barton Springs salamander. City staff, however, believed they had identified a threat – PAHs from sealcoated parking lots. The City had engaged various consultants to look at sources of PAHs in soils on a hillside above Barton Springs and, in a series of articles published by the Austin American-Statesman in 2003, the belief of city staff that the consultants were wrong, that the sealcoated parking lot was the source of PAHs.[28] If these news accounts from Austin in the early 2000s are to be believed,[29] banning RTS was a goal long pursued by City staff who apparently had predetermined that RTS should be banned well before the USGS studies were even conducted. Indeed, the desire of COA staff to find a connection between RTS and PAHs in sediment can be seen in the description of the study reported in the newspaper.[30] Needless to say, the potential for research bias under these circumstances was high. By citing and summarizing Mahler et al. (2005) and Scoggins et al. (2007) on the CADDIS website (via Exhibit B) without evaluating the reliability, goals and limitations of these articles, the EPA has done little more than to blindly promote the agenda of certain employees of the USGS and COA to phase out RTS from the marketplace..

In furtherance of the COA's agenda, adopted as its own by the USGS, evidence had to be generated which showed that the above mentioned PAH "hotspots" created unacceptable environmental impacts, either in terms of human health risks or injury to stream biota. Scoggins et al. (2007) was once again cited within Exhibit B to fill this need. According to this study, decreases in downstream macroinvertebrate richness and density could be explained by increased levels of PAHs in sediment, and those PAHs must have come from RTS, at least according to the inferences that are to be drawn from Mahler et al. (2005).[31] The CADDIS posting thereby appears to provide an environmental activist looking to "act locally" with all of the necessary "background" information needed to convince municipalities and governmental entities across the country that RTS should be banned or phased out. The problem with this analysis, however, is that while certain findings from Scoggins et al. (2007) and Mahler et al. (2005) are cited, CADDIS' own criteria as well as subsequent peer reviewed articles that call into question the validity of these findings have been ignored.

DOWNSTREAM IMPACTS UNCONFIRMED

In providing general insights regarding the strength of certain types of evidence, the CADDIS website notes that "if an effect occurs downstream of a source, that is weak supporting evidence for emissions from that source as a cause..."[32] Remarkably, this same type of evidence, characterized by CADDIS as being "weak," is nevertheless offered up in Exhibit B as its primary "proof" that upstream coal tar sealed parking lots must have been causing PAH contamination

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[28] Austin American-Statesman Dec. 31, 2003. *Barton Creek cleanup costs rise: Projected price tag for tending to tainted soil jumps to $1.1 million.* http://www.statesman.com/

[29] *Id.*

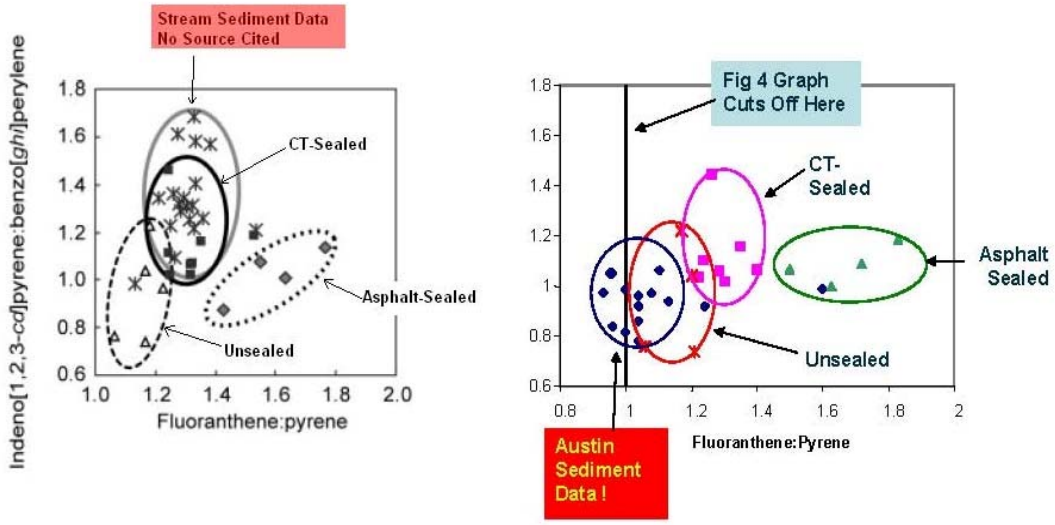
[30] Austin American-Statesman May 5, 2004. *Parking lot toxins lower than reported, agency say.* "The agency [USGS] has been working with Austin water quality officials to test the city's theory that toxic chemicals in sediments in Barton Creek, Barton Springs Pool and other Austin waterways are coming, in large part, from polluted particles that rain washes off parking lots." http://www.statesman.com/

[31] This is a common error of logic. Correlation does not prove causation, The fact that a rooster crows every morning just before sunrise does not mean that the rooster causes the sun to rise.

[32] http://www.epa.gov/caddis/si_approach.html

and biota degradation downstream. As it happens, even Mahler and Scoggins seemed to recognize the flaws in this argument since both attempted to shore up it up by presenting in their articles an environmental forensics technique – PAH double ratio plots - often applied as a first step in attempts to identify sources of PAHs. The double ratio plots, which are not mentioned in Exhibit B but are examined in detail below, failed to demonstrate that RTS from upstream parking lots was, in fact, causing downstream PAH contamination in sediment. Why these results were overlooked in Exhibit B is unknown.

Figure 4 from Mahler et al. (2005; graph on the left, below) seemingly demonstrates that PAH ratios from Austin urban stream sediment closely matched ratios generated by particles washed from parking lots covered with RTS. However, when DeMott and Gauthier (2006[33]; graph on right, below), attempted to reproduce Mahler's graph using actual data from sediments in Austin streams, as provided to them by the COA as the sediment results used in the Mahler et al. (2005) paper, they were unable to either reproduce the graph or find a relationship between RTS and Austin sediment PAHs.



ES&T Article – Figure 4 **Re-Plot with Austin Sediments**

The EPA Guidelines could not be clearer about the importance of the reproducibility of environmental data and findings. In a response to DeMott and Gauthier's comment, Mahler and Van Metre (2006)[34] tried to explain away this inconsistency by asserting that the commenters used different sediment samples. Unfortunately, and contrary to sound scientific procedure, Mahler and Van Metre (2006) did not make the underlying data available, so it was impossible for a long period of time to double check the accuracy of the assertions. Eventually, it became clear that Mahler et al. (2005) did not actually use PAH concentrations from stream sediment in

[33] DeMott, obert P. and Thomas D. Gauthier. "Comment on "Parking Lot Sealcoat: An Unrecognized Source of Urban Polycyclic Aromatic Hydrocarbons"." *Environmental Science & Technology* 40, (2006): 3657-3658
[34] Mahler, B.J., Van Metre, P.C., Bashara, T.J., Wilson, J.T., and Johns, D.A., 2006, *Response to comment on 'parking lot sealcoat: an unrecognized source of urban polycyclic aromatic hydrocarbons'*: Environmental Science and Technology, vol. 40, no. 11, p. 3659-3661. doi: 10.1021/es060585i

the plot, such as was done by DeMott and Gauthier (2006). Instead, Mahler et al. (2005) measured suspended solids in stream water, which were called "suspended sediment." Why Mahler et al. (2005) chose to rely on results of analyses of suspended solids for their fingerprinting and not complete the study design by including results from actual stream sediment is still unknown –and has resulted in confusion- especially since scientists before and after Mahler et al. (2005) have continued to focus their research on sediment.

Just as perplexing, in Mahler et al. (2005) the samples of suspended solids were not collected in the immediate vicinity of the few parking lots that had undergone the wash off testing, nor were the suspended solids all sampled at the same time, the same place or even in the same year. Specifically, four suspended solid samples were collected during the year that immediately preceded the parking lot testing from a creek in Austin having no relationship to the studied parking lots. Twelve other suspended solid samples were collected in yet a different year from three other streams.[35] None of these other three streams was located anywhere near Austin. Instead, they were in central Fort Worth, Tx, which is nearly 200 miles away. Thus, it is clear that none of the suspended solid sampling was spatially or temporally related to the parking lot study in question, which makes the double ratio analysis presented in Mahler et al. (2005) of questionable scientific value.

By the end of 2006, the only published attempt to use an environmental forensics method to compare Austin stream sediment with parking lot PAHs was DeMott and Gauthier's (2006) attempt to reproduce Mahler et al.'s (2005) double ratio plot. As indicated above, DeMott and Gauther's comment (which is mentioned nowhere within Exhibit B) concluded that double ratio plots using actual sediments from Austin failed to demonstrate any relationship between the PAHs in sediment and RTS. Clearly, these findings were inconsistent with the ban on RTS that had already been instituted in Austin. In Scoggins et al. (2007), COA staff also used data collected from Austin stream sediments in double ratio plots to evaluate whether sediment PAHs could be matched to those associated with RTS. The results obtained by Scoggins et al. (2007) were consistent with those found by DeMott and Gauthier (2006). They found "no significant clustering of field data with known source data."[36] Scoggins et al. (2007) then tried to explain why the observed results were inconsistent with what they had hoped to find by speculating as follows:

> Our inability to associate PAH contamination in our study streams with coal-tar sealant might have been because we analyzed only the 16 EPA priority PAHs in field sediments or because extensive weathering and mixing with other materials occurs as the coal-tar sealant abrades and moves from parking lots to stream systems.[37]

Of course, another possibility not mentioned in Scoggins et al. (2007) is that RTS was not the primary source of PAHs in Austin streams. The failure to find a relationship between

[35] It was not until the summer of 2013, after PCTC asked for the assistance of the American Chemistry Society (which had published Mahler et al (2005)) that the sources of the 16 "suspended sediment" samples were revealed.
[36] See fn 14, *supra*, p. 702.
[37] *Id.*

the signature of PAHs in RTS and the signature found in sediments reported by Scoggins et al. (2007) confirms the same observation made by DeMott and Gauthier (2006). The failure of Scoggins et al. (2007), and Exhibit B, to acknowledge the possibility that RTS was not the primary source of PAHs found in sediment is problematic and misleading.

The problems and limitations associated with Scoggins et al. (2007) and Mahler et al. (2005) illustrate why data evaluations schemes such as CADDIS include detailed reviews of the scientific bases for making associations between sources and environmental receptors. Are these the types of issues that should have been raised or acknowledged on the CADDIS "Pavement Sealants and PAHS" webpage? Certainly. Indeed, it is difficult to understand how they were omitted. A related question that should be asked is what sort of pre-dissemination review, if any, was conducted by the EPA before Exhibit B was posted? By failing to note the limitations of the Scoggins et al. (2007) and Mahler et al. (2005) articles, policy makers, resource managers, the public and other researchers have been mistakenly led to believe that the science regarding "downstream impacts," as mentioned on the webpage, has been settled when clearly that is not the case.

DATA ON BENTHIC LIFE ARE INCONSISTENT

A second impression created by the CADDIS "Pavement Sealants and PAHS" webpage, and perhaps the most important when it comes to influencing policy makers, is that PAHs from RTS allegedly have been shown to adversely affect biota in nearby streams and bodies of water. Once again, Mahler et al. (2005) and Scoggins et al. (2007) have reported results that in no way prove this hypothesis. Accordingly, the EPA must correct this webpage to reflect the facts and science as they now exist, and not present only those theories that support the agenda-driven "science" of a few.[38]

For example, Scoggins et al. (2007) reports that the COA water body which allegedly had the greatest level of PAH contamination downstream was Barton Creek. A fact not mentioned on the EPA website is that PAHs in Barton Creek sediment also had some of the lowest impacts on biota. Scoggins et al. (2007) failed to find any correlation between the size of sealed parking lots upstream and degradation of downstream biota. Once again, these inconsistencies were attributed to the "complex mix of urban stressors on the benthic communities in these streams."[39] Scoggins et al. (2007) acknowledged that their data set was "very small." Each of these findings cast doubts on the initial impressions generated by Exhibit B, yet no mention of them can be found anywhere within Exhibit B. The public is left to jump to conclusions that are not supported by the data.

[38] The manner in which Mateo Scoggins and Tom Ennis (both of the COA), Peter Van Metre and Barbara Mahler (both of he USGS), Judy Crane (Minnesota Pollution Control Agency) and Allison Watts (University of New Hampshire) have worked together to pursue their anti-coal tar sealant agenda is spelled out in detail as part of the PCTC's first USGS DQA challenge filed on May 15, 2013 regarding the 40 Lakes Paper and will not be repeated here. See fn 2, *supra*.

[39] Journal of the North American Benthological Society, 2007, Vol. 26(4): p. 704

Scoggins et al. (2007) was not the only study of biota in COA streams. For example, the Texas Commission for Environmental Quality (TCEQ) also sampled Barton Creek sediment a few years earlier in 2003 and 2004 and concluded that with few exceptions, the environmental quality of the creek was better than that expected when compared to typical water bodies in urbanized areas.[40] This was true even though a large parking lot sealed with RTS was identified in the vicinity of the creek and sampling areas and even though a former town gas site is located near Barton Springs Pool. The TCEQ concluded that aquatic life in Barton Creek was not impaired by alleged sediment toxicity associated with PAHs or any other chemical.[41] The Scoggins et al. (2007) study can be best understood as an attempt to ascribe adverse impacts to PAHs derived from RTS in stream and Barton Springs sediment. However, like DeMott and Gauther (2006), Scoggins et al. (2007) was unable to link sediment PAHs to RTS, and further was unable to correlate upstream sealed parking lots with downstream degradation, and did not address previous findings of the minimal to non-existent impacts of PAHs on Barton Creek by the TCEQ.

Another point overlooked by the EPA in its CADDIS "Pavement Sealants and PAHS" webpage is that only two of the seven streams evaluated by Scoggins et al. (2007) had downstream samples that exceeded the Probable Effects Concentration (PEC) of 22.8 mg/kg for PAHs in sediment,[42] and those two streams only barely exceeded this policy driven number which is not applicable when the bioavailability of PAHs in sediment is low – as it is most in most instances. As developed, the PEC of 22.8 mg/kg was intended to apply only to fauna such as worms, slugs and aquatic larvae, and not to fish or humans. PECs are not applicable to non-bottom feeding organisms because PAHs are generally insoluble, do not directly affect water quality and are not associated with exposures in the water column. PAHs sink to the bottom of waterways attached to sediment particles, along with many other substances found in urban and suburban storm water, such as pesticides, herbicides, animal waste, tire particles and soot. Because sediment-bound PAHs are often found to have low bioavailability, the PEC is often overly conservative even for bottom feeding organisms. Humans seldom if ever ingest significant quantities of sediment even when swimming in natural waterways, thus human health risks are miniscule. This fact was taken into account by the Texas Department of Health (TDH) as part of its Barton Springs assessment in 2004, explored in greater detail below.

PAHs are virtually insoluble in water, partitioning strongly into the solid phase where they are tightly bound to organic materials within sediments. The hydrophobic characteristic of PAHs makes them unavailable for exposure to aquatic organisms, and thus there is often no correlation between the measured PAH concentrations in sediments and those concentrations that adversely affect benthic organisms.[43] Thus, predictions of sediment toxicity in the real world cannot be based on measured PAH concentrations. To address the need to be both protective of

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[40] TCEQ, Barton Creek Sediment Toxicity Evaluation to Aquatic Life, July 29, 2004; http://www.tceq.texas.gov/toxicology/barton/BSPFull_PDF.html/at_download/file

[41] *Id*.

[42] Barton Creek had one downstream sample that was measured at 32 mg/kg and Walnut Stream had one that was measured at 30 mg/kg.

[43] Neuhauser, E., J. Kreitinger, D. Nakles, S. Hawthorne, F. Doherty, U. Ghosh, M. Khalil, R. Ghosh, M. Jonker and S. van der Heijden (2006). "Bioavailability and toxicity of PAHs at MGP sites." Land Contamination & Reclamation 14(2): 261 - 266.

the environment and realistic in assessing risks to benthic organisms, EPA developed a tiered approach to evaluating potential sediment toxicity to help policy makers and resource managers expend resources appropriately in managing PAH-containing sediment.[44] The tiered approach involves bioavailability testing of PAHs in the whole sediment (Tier 1), bioavailability testing based on concentrations of PAHs in pore water (Tier 2), and sediment toxicity testing to evaluate the probable risk of adverse effects (Tier 3).

The Department of Defense (DoD) applied EPA's approach to a study of the impact of PAHs on benthic life in the Anacostia River where several military facilities located in the area of Washington D.C. had released large quantities of PAHs into waterways over many decades. The phenomenon the EPA approach was designed to address was observed in the DoD study, in which the PEC value (23 ppm) is actually well below the level at which toxic effects to benthic organisms were observed to occur, as demonstrated in the figure below. [45]

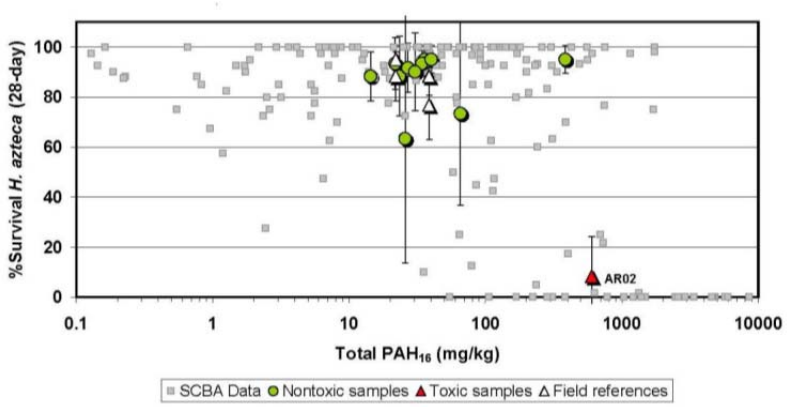

Figure 5-2. Bulk Sediment PAH_{16} Compared to *H. azteca* Survival.

Similar results have been reported by other researchers, such as Neuhauser and colleagues, who also found that standard toxicity testing of benthic organisms showed virtually no toxicity at PAH concentrations much greater than the PEC value of 23 ppm.[46] These results are also consistent with the observation in Scoggins et al. (2007) that Barton Creek, in which one sample had the highest PAHs sediment measurement of 32 ppm, had essentially normal biota. In other words, the alleged environmental concerns generated by the CADDIS "Pavement Sealants and PAHS" webpage, as presently written, have been exaggerated, are speculative, and need to be corrected.

ACTIONS TO BE TAKEN

Presently, it is unknown how the current version of Exhibit B came to be an EPA

[44] Burgess, R. M. Evaluating Ecological Risk to Invertebrate Receptors from PAHs in Sediments at Hazardous Waste Sites (Final Report). U.S. Environmental Protection Agency, Ecological Risk Assessment Support Center, Cincinnati, OH, EPA/600/R-06/162F, 2009.
[45] Geiger, S., AECOM, Final Report - The Determination of Sediment Polycyclic Aromatic Hydrocarbon (PAH) Bioavailability using Direct Pore Water Analysis by Solid-Phase Microextraction (SPME), ESTCP Project ER-200709, Aug. 2010, p. 48 (report may be downloaded at http://www.serdp-estcp.org/Program-Areas/Environmental-Restoration/Risk-Assessment/ER-200709/ER-200709).
[46] See fn 43, *supra*.

publication and disseminated on EPA's website. One possibility is that EPA staff simply relied on the USGS and the COA articles about RTS and their alleged impact on streams and sediment without looking further into the matter. Regardless, Exhibit B represents a clear violation of the EPA's Information Quality Guidelines and of the philosophies behind CADDIS. As such, Exhibit B must be withdrawn pending correction.

If the PCTC had been consulted, as contemplated under the CADDIS guidelines, it is certain that many of the issues raised above would have been brought to the attention of the EPA and presumably would have found their way into a more complete and accurate version of Exhibit B. As demonstrated above, the flaws and limitations of Scoggins et al. (2007) and Mahler et al. (2005) must be addressed along with (1) the ecological assessment conducted by the TCEQ in Barton Springs, (2) the inability to reproduce the information on which the conclusions of Mahler et al.(2005) are based (as reported by DeMott and Gauthier (2006) and confirmed by Scoggins et al. (2007)), and (3) the benthic life toxicity testing performed for the DoD and similar results reported by others. Other more recent studies must also be mentioned. By now, it should be readily apparent that the CADDIS website can no longer cite Scoggins et al. (2007) and Mahler et al. (2005) as though they are the only references worth mentioning on the issue of RTS and its alleged impact on the environment. In order for the CADDIS website to reflect sound science rather than just advocacy, the list of references must be updated to reflect all relevant information, studies and articles. Some of the most recent publications that need to be consulted and cited for their content can be found in Exhibit D, attached.

As things now stand, the EPA should immediately remove the CADDIS Pavement Sealants and PAHs webpage. Once this is done, the PCTC will gladly participate in any future discussions that the EPA may wish to have geared toward creating an accurate and unbiased webpage that outlines the issues presently being debated regarding RTS. The new webpage must be based on all of the relevant investigations and peer reviewed publications, not just studies generated by the USGS and COA and the "ban RTS" affinity group that has developed over time.

EPA STORMWATER BEST MANAGEMENT PRACTICE (EPA Publication #2)

EPA's Stormwater Best Management Practice publication, attached as Exhibit C, has three sections that merit specific attention. The first section is on the left side of page 1 and is entitled "Could Coal-Tar Sealcoat Be of Concern for Stormwater?" It begins with another reference to Mahler et al. (2005) and its assertion that the amount of PAHs found in storm water runoff is higher with RTS sealed parking lots than with unsealed parking lots. Presumably, Mahler et al. (2005) was cited once again to create an impression that RTS must be contaminating nearby streams and ponds. And, once again, there is no mention of the manner in which the findings and methodologies of Mahler et al. (2005) have been questioned in subsequent research and publications.

Even Mahler and co-authors seemed to recognize that neither Mahler et al. (2005) nor Scoggins et al. (2007) had, in fact, demonstrated that PAHs from RTS were a significant source of contamination in stream and pond sediment. Indeed, the inability of DeMott and Gauther (2006) and Scoggins et al. (2007) to reproduce a similarity in PAH ratio signatures between RTS

and actual sediment signatures had not been refuted. Thus, Mahler and several colleagues (including her husband Dr. Peter Van Metre) used additional government funding to research and publish in 2010 an article entitled "Contribution of PAHs from Coal-Tar Pavement Sealcoat and Other Sources to 40 U.S. Lakes."[47] This article (Van Metre and Mahler 2010), is prominently cited in the first section of Exhibit C (left side) for the proposition that "coal tar sealcoat is the largest source of PAHs to 40 urban lakes." As presented, this proposition is uncontested, thereby encouraging readers (including legislators and other government personnel) to infer that this article represents the present state of science on this topic. That is not the case, and any such inference that has been created by the EPA, whether intentional or not, must be corrected. OMB, EPA and CADDIS Guidelines mandate that appropriate action be taken.

VAN METRE & MAHLER (2010) AND SUBSEQUENT CRITIQUES

From the perspective of those who wish to ban RTS, the irreproducibility of the seemingly simple double ratio plot method of source identification must have been disheartening. A different method would be needed if there was going to be any hope of forensically connecting sediment PAHs with RTS. Van Metre and Mahler (2010) attempted to do this by adapting a source identification and apportionment model developed by EPA "to identify sources of inorganic compounds in the atmosphere:" the Chemical Mass Balance (CMB) model.

Publication of Van Metre and Mahler (2010) moved the focus away from Austin, which was understandable in view of the findings published by the TCEQ for Barton Springs and the PAH ratio signature results noted by DeMott and Gauthier (2006) and Scoggins et al. (2007). Use of the CMB model was instead directed toward proving that RTS was the primary source of PAHs in 40 lakes throughout the United States, and in Van Metre and Mahler (2010), they claimed to have achieved this result. An overview of Van Metre and Mahler (2010) allows one to conclude rather quickly that without the new CMB modeling results, there is little to support the USGS' proposition that RTS is the "dominant" or "most substantial" source of PAHs in lake sediment. Thus, if the CMB modeling is in some way flawed, incomplete or inconclusive, then it necessarily follows that the conclusions of Van Metre and Mahler (2010) are also flawed and cannot provide a science-based foundation for any agenda to ban RTS, voluntarily or otherwise.

Several publications challenge the findings of Van Metre and Mahler (2010). The first was a comment on that paper and a companion paper (Van Metre et al., 2009) by O'Reilly et al. (2011).[48] In 2012, a peer-reviewed overview of the body of USGS (Mahler – Van Metre) source identification and apportionment efforts was published by Dr. O'Reilly and others titled "Forensic Assessment of Refined Tar-Based Sealers as a Source of Polycyclic Aromatic Hydrocarbons (PAHs) in Urban Sediments."[49] Of particular significance, O'Reilly et al. (2012) followed CADDIS guidelines by using a "multiple lines of evidence" approach to address the results being claimed by Van Metre and Mahler (2010). According to O'Reilly et al. (2012), while Van Metre and Mahler (2010) identified some similarities between the PAH profiles of

[47] Van Metre, P.C., Mahler, B.J., Science of the Total Environment, Vol. 49, pp. 334-344 (2010).
[48] O'Reilly, K., J. Pietari, and P. Boehm, 2011, Comment on "PAHs Underfoot: Contaminated Dust from Coal-Tar Sealcoated Pavement is Widespread in the U.S.": Environmental Science & Technology, v. 45, p. 3185-3186.
[49] Environmental Forensics, Vol. 13, pp 185-196.

RTS and urban sediments, such profiles are not unique to RTS and likely had been impacted by weathering. It should be noted that O'Reilly et al. (2012) was published six months *before* the EPA posted Exhibit C and the critical comment (O'Reilly et al., 2011) had been published over a year prior to dissemination of Exhibit C.

In another related, peer reviewed article, O'Reilly and coauthors took their analysis further by using Principle Component Analysis (PCA) to evaluate in detail individual sediment sampling locations included in the USGS model. This paper, published online in 2013, is titled "Parsing Pyrogenic Polycyclic Aromatic Hydrocarbons: Forensic Chemistry, Receptor Models, and Source Control Policy."[50] The findings demonstrate that the CMB modeling used in Van Metre and Mahler (2010) fail to support the claim that parking lot sealers are a significant source of PAHs in urban sediments in either Austin, TX or Lake Ballinger, WA. Yet, Exhibit C makes it appear as though the conclusions offered by Van Metre and Mahler (2010) are an unchallenged scientific fact. Obviously, that is not true and Exhibit C accordingly must be removed from the internet and corrected.

Concerns about the misuse of the CMB model (as configured by the USGS) continue, especially since many of the same mistakes are being made by other authors who have adopted what appears to be a USGS approved method. Another government scientist who has worked closely with Drs. Van Metre and Mahler, Dr. Judy Crane of the Minnesota Pollution Control Agency, has stepped into the fray by recently publishing an article that seems to respond directly to the critiques of O'Reilly et al. (2012).[51] While this exchange of ideas is welcomed and fundamental to the progress of science, the manner of the discussion raises several questions. Dr. Crane has crafted her article so that it makes no reference or citation to any of the peer reviewed literature that challenges earlier USGS articles, such as the series of papers published by O'Reilly et al. (2011, 2012, 2014a) or earlier papers that question the purported relationship between RTS and PAHs in urban sediments (DeMott and Gauthier, 2006; DeMott et al., 2010, Scoggins et al., 2007). Yet, Dr. Crane seems to respond to O'Reilly et al. (2012) point by point, especially with respect to his critiques that Van Metre and Mahler (2010) neglected to consider a null hypothesis and multiple lines of evidence. If this reflects an intentional tactic by Dr. Crane to minimize the impact of O'Reilly et al. (2012) and O'Reilly et al. (2014a) by reducing the number of times that these articles are cited, that is a problem and a clear example of White Hat Bias. Additionally, if references to the O'Reilly articles were omitted as part of an effort to prevent others from reading these articles, that is also a problem. Unfortunately, this failure to cite publications with opposing points of view is becoming a regular feature of publications authored by members of the "ban RTS" affinity group.[52]

Regardless, in partial response to a Freedom of Information Act (FOIA) request and in information provided in response to a request for the assistance of the American Chemistry

[50] Integrated Assessment and Environment Management, 2014a. Vol 10, pp. 279-285.
[51] Crane, J. L., 2013, "Source Apportionment and Distribution of Polycyclic Aromatic Hydrocarbons, Risk Considerations, and Management Implications for Urban Storm Water Pond Sediments in Minnesota, USA;" Arch Environ Contam Toxicol. DOI: 10.1007/s00244-013-9963-8.
[52] Via FOIA responses, PCTC is also in possession of emails that seem to demonstrate a coordination of efforts among USGS, COA and Minnesota government employees to suppress public awareness of industry-funded research. PCTC is investigating how best to make these emails available to the public.

Society's Ethics Committee, the USGS has provided sufficient underlying information to reconstruct the USGS CMB modeling results, which is reflected in an article by O'Reilly and others recently accepted for publication in *Polycyclic Aromatic Compounds* (O'Reilly et al. 2014b). This article uses Dr. Crane's paper as another case study to illustrate the manner in which CMB can be misapplied and lead to erroneous conclusions.[53] O'Reilly et al. (2014b) points out how Dr. Crane makes the same types of mistakes as Drs. Van Metre and Mahler by failing to recognize properly that her results essentially can be recreated even when RTS is removed from the CMB analysis. In scientific terms, all three scientists have failed to prove the null hypothesis which is a fundamental and a necessary step in evaluating any theory, mediating acceptance of the theory by the science community as a whole. In addition, with the information received via the FOIA request, a comprehensive evaluation of the USGS application of the CMB model to PAHs in sediments was made possible, resulting in the *Technical Evaluation of Van Metre and Mahler (2010)* included here as Exhibit E.

CONFUSION REGARDING ENVIRONMENTAL IMPACTS

In the paragraph that follows the reference to Van Metre and Mahler (2010), and after leading the reader to believe that large quantities of PAHs are released into the environment, Exhibit C states that "PAHs are of concern because of their harmful impacts on humans and the environment . . . [S]everal PAHs are known or probable human carcinogens and toxic to aquatic life." Yet, as discussed above, EPA elsewhere recognizes that, in the real world, there is often no correlation between sediment PAH concentrations and toxicity to aquatic organisms, and has developed an approach to determining if sediment toxicity could be of potential concern. Many of the issues regarding the impact of PAHs on aquatic life have already been addressed above and will not be repeated here. Suffice it to say that alleged risks to aquatic life, as claimed in Scoggins et al. (2007) (which is cited in Exhibit C), appear to be exaggerated and, as of yet, still have not been forensically linked to PAHs coming from RTS. Scoggins et al. (2007) is a small study, and inconsistent with earlier findings and conclusions offered by the TCEQ. Further, the Scoggins et al. (2007) study, as well as Exhibit C, does not consider sediment PAH toxicity in the broader context of the extensive science that has been published by others on this topic. As things now stand, the RTS theory being pushed by the USGS is nothing more than a questionable hypothesis being treated as a fact.

As a cautionary note, PCTC recommends that EPA should be careful when reviewing any new claims of environmental impact that might be made by the USGS in the future. The extent to which the USGS has been willing to exaggerate such claims in the past was made clear in a second DQA challenge that was filed by the PCTC on May 31, 2013.[54] The focus of this challenge is the USGS' use of catfish pictures with horrible looking lesions on their lips as evidence of what PAHs and, in theory, RTS can do to fish in streams and rivers. Ironically, it turns out that many of the afflicted catfish that were studied and photographed came from the Anacostia River where, as mentioned above, the DoD had admitted to releasing large quantities of PAHs into the environment. Even more significant, however, is the fact that the lip tumors

[53] O'Reilly, K. T., S. Ahn, J. Pietari, and P. D. Boehm, 2014b, Use of receptor models to evaluate sources of PAHs in sediments: Polycyclic Aromatic Compounds. Awaiting DOI.
[54] *See* fn 2, *supra.*

displayed in photos used by the USGS have *not* been shown to be caused by PAHs or by RTS. One theory presently being considered is that the tumors might instead be related to viruses. Nevertheless, if one goes to the USGS' Coal Tar Sealant "Fact Sheet," the catfish photo can still be seen at page 5, still scaring a trusting public. This illustrates the danger in blindly citing USGS websites and publications, which would seem to be subject to less than rigorous internal review, without first conducting an independent review of the assertions being made. Another way of stating this recommendation is to urge EPA to rely on its own CADDIS guidance in evaluating environmental impacts suggested by any study conducted by any research team.

CONFUSION REGARDING HUMAN IMPACTS

The reference in Exhibit C to "harmful impacts on humans" presumably is both scary and vague. Certainly, the reader is encouraged to jump to the conclusion that RTS can cause cancer since RTS contains PAHs and PAHs "are known or probable human carcinogens."[55] If the goal is to convince the public that RTS use should be banned or discontinued, creating fear is a crucial part of this strategy. As it turns out, this fear has no basis in fact as far as RTS is concerned, and any inference along those lines created by Exhibit C must be clarified and corrected. The purpose of EPA publications is to provide accurate and unbiased information to the public, not to generate unnecessary anxiety.

Referring once again to the much cited Scoggins et al. (2007), it was related earlier that the TCEQ was asked to assess to what extent certain parking lots, covered with RTS, may have impacted nearby biota in and around Barton Springs. The TCEQ repeatedly concluded that no adverse impacts could be found of any significance. As part of that same investigation, the Texas Department of Health (TDH), the ATSDR and EPA Region 6 also became involved to determine if human health was being adversely affected, especially since so many residents of Austin use the Barton Springs pool for recreational swimming, including children of all ages. After conducting an extensive study, as highlighted in the quote below, the TDH and ATSDR concluded that any theoretical cancer concerns raised by the press and environmentalists were insignificant.[56]

> We reviewed the results from water and sediment samples collected by the City of Austin, the United States Geological Survey, the Lower Colorado River Authority, and the Texas Commission on Environmental Quality. We reviewed over 14,500 individual data points, involving approximately 441 analytes, collected over the past 12 years. We screened the contaminants by comparing reported concentrations to health-based screening values and selected twenty-

[55] In the reference section of Exhibit C, readers are encouraged to visit the EPA's Integrated Risk Information System (IRIS) website, presumably to obtain additional information regarding the characterization of B(a)P as a "probable human carcinogen." Presently, as part of the IRIS program, the EPA in Washington D.C. is updating its hazard assessment and toxicological review of B(a)P. Public comments have been solicited. As part of this process, epidemiology and toxicology studies have been reviewed which indicate that the International Agency for Research on Cancer (IARC) needs to revise its PAH hazard assessment to comport with the findings of modern scientific studies rather than centuries old case reports .

[56] ATSDR, Health Consultation Barton Springs Pool, April 18, 2003, p. 1
https://www.google.com/#q=barton+springs+pool+health+consultation

> seven contaminants for further consideration. Of those 27 contaminants, 20 were polycyclic aromatic hydrocarbons (PAHs). The others included arsenic, boron, cadmium, bis(2-ethylhexyl)phthalate, total petroleum hydrocarbons (TPH), thallium, and lead.
>
> * * *
>
> *We did not find any information to support contention that swimming every day in Barton Springs would result in adverse health effects.* Thus, **we have concluded that swimming and playing in Barton Springs Pool poses no apparent public health hazard**. We recommend continued public health education to address any questions that the public may have concerning the risks associated with swimming in the pool. (All emphases in original.)

EPA Region 6 arrived at nearly an identical set of findings which was confirmed in a letter sent by Director Myron Knudson to the City of Austin dated April 17, 2003. His conclusions were:

> 1. The information reviewed does not indicate that people who swim in the Barton Springs Pool would be exposed to levels of contaminants that would be expected to cause adverse effects.
>
> 2. Adverse health outcomes from exposure to soil near the creosote-treated posts used for erosion control near the shallow end of the pool are not likely.
>
> 3. The levels of total petroleum hydrocarbons detected in both the water and sediment in the pool are not expected to result in adverse health outcomes.

A copy of said letter is attached as Exhibit F.

As part of this investigation, the TDH and ATSDR reviewed the literature regarding PAHs and their alleged role in causing cancer in humans. Their findings, quoted below, are clearly inconsistent with the message of fear that has been generated by Exhibit C, as presently drafted. [57]

> Benzo[a]pyrene (BaP) is perhaps the most toxicologically significant PAH and along with several other PAHs has been classified by the EPA as a "probable human carcinogen". This classification is based on animal data where repeated BaP administration in numerous strains of at least four species of rodents and several primates has been associated with increased incidences of total tumors and of tumors at the site of exposure. Human data specifically linking benzo[a]pyrene (BaP), or any of the other PAHs to a carcinogenic effect are lacking. Although lung cancer has been found in humans by exposure to various mixtures of polycyclic aromatic hydrocarbons known to contain BaP including cigarette smoke, roofing tar, and coke oven emissions, it is not possible to conclude from this information that BaP or any other of the PAHs is the responsible agent.

[57] *Id*., p.7-8.

The TDH and ATSDR also demonstrated through a risk assessment that the greatest theoretical cancer risks would not come from exposure to PAHs in sediment or water, but instead would come from the PAHs that are in our food.[58] These are facts are missing from the EPA publications that are the subject of this Request for Correction. There can be no real dispute that EPA and OMB Guidelines mandate that such information be made available to the public as part of any assessment or summary which raises the issue of RTS and potential human health effects.

In a similar type of analysis, the Food and Drug Administration (FDA) has approved the use of coal tar, which contains high concentrations of PAHs, in therapeutic products and medications that are applied directly to the skin of patients and consumers. In doing so, the FDA considered the long history of coal tar use in this manner, as documented in the scientific literature, and concluded that such exposures do not increase people's risks of cancer.[59] Similarly, there is no evidence that low level or intermittent exposure to coal tar or coal tar pitch, beyond its therapeutic uses, has caused cancer in humans. And perhaps most important for the purpose of this Request for Correction, there is not one peer reviewed study in the world's published medical and scientific literature which has found that RTS specifically causes cancer in humans – not one. This is true despite decades of widespread use. All of this information has been omitted from Exhibit C.

On January 24, 2012, another RTS article written by Drs. Mahler and Van Metre was published. This one was titled "Coal Tar Based Pavement Sealcoat and PAHs: Implications for the Environment, Human Health, and Stormwater Management." It is the last article cited by the EPA in support of Exhibit C. Near the end of this article and in a section captioned "Human-Health Concerns," the authors speculated that "non-dietary ingestion of PAH-contaminated house dust and soil likely are the most important routes of exposure, but a complete human risk analysis is required before the cancer risk associated with ingestion of these media can be quantified." Ten months later just such an analysis was published which will be referred to as the "Williams/USGS Risk Assessment."[60] It would appear that Exhibit C was prepared at roughly the same time, or perhaps a bit earlier, which may explain why the Williams/USGS Risk Assessment is not mentioned within Exhibit C.

A great many flaws were found to exist within the Williams/USGS Risk Assessment which include mistakes and unexplained selective use of data in data collection, sampling techniques, exposure factor calculations, cancer slope factor assumptions, and the interpretation of data. These mistakes led the PCTC to file a third USGS DQA challenge, this one on September 18, 2013. Details will not be repeated here, but can be found at the USGS Quality

[58] Id., *compare* Appendix D p. 71 (food risks) with Table 4 p. 31 (sediment risks) and Appendix D p. 71 (water risks). Risks associated with an average US diet greatly exceed any alleged risk associated with PAHs in Barton Springs pool.
[59] See Dennis Baker letter, FDA, 2/22/01; http://www.fda.gov/ohrms/dockets/dailys/01/Mar01/030601/pdn0001.pdf
[60] Williams, E.S.; Mahler, B.J.; Van Metre, P.C., Cancer risk from incidental ingestion exposures to PAHs associated with coal-tar-sealed pavement. Environ. Sci. Technol. 2012, v. 47 (2), 1101-1109.

Information website.[61] Suffice it to say that no scientist has yet reproduced the USGS risk assessment findings and conclusions, and it is doubtful that any will do so.[62]

Certainly, all of these facts are the type that should be important to members of the public (including policy makers) who are trying to assess in an even handed manner what type of human health risks, if any, are associated with RTS. Unfortunately, someone at the EPA apparently decided that it was best for the public not to have this information, or in the alternative, was somehow unaware of the many peer reviewed articles and DQA challenges that exist. Either way, Exhibit C must be corrected and amended to include references to these additional resources, articles and facts. To exclude them would be a clear example of White Hat Bias and an ongoing violation of the OMB and EPA Information Quality Guidelines.

WHAT ARE STATES AND MUNICIPALITIES DOING?

The second section within Exhibit C (found on the right side of page 1) that requires correction is the EPA's suggestion that there is a wave of growing support in favor of RTS bans across the country. The first question to be asked is why such information has been included at all. This "scorecard" obviously has nothing to do with science and is an example of advocacy, pure and simple. For this reason alone, this section should be deleted from Exhibit C.

Even if one assumes for the sake of argument only that RTS advocacy somehow is an appropriate activity for the EPA, the next question to be asked is whether this scorecard has been drafted in such a way as to mislead the public into thinking that all "enlightened" governmental entities which have considered the issue have decided to implement bans or restrictions. While this would certainly appear to be intent behind the scorecard, the truth is very much different.

According to the U.S. Census Bureau, there were 36,011 municipalities and townships in the United States in 2007, and of course, 50 states. The only two states that have banned the use of RTS are Minnesota and Washington, and Washington is a state where RTS generally is not used, so a ban there is essentially meaningless. And as for the rest of the 48 states, well over 99.9% of the local governments in these states have no bans or restrictions on the use of CTS. Bills to ban or restrict RTS have been presented in other states, and have been met with defeat, and for good reason. The science does not support the hypotheses and fear being generated by RTS ban advocates.

Quite simply, there is no mandate to ban RTS across the country. Well informed people have decided otherwise. Implying that there is some sort of trend here is inappropriate and another example of White Hat Bias.

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[61] See fn 2, *supra*.

[62] A Comment which questions the conclusions set forth within the Williams/USGS Risk Assessment has also been published, along with a Response from the original authors. *Environ. Sci. Technol.*, **2014**, *48* (1), pp 868–871). Given the format imposed by the Journal, the arguments presented are an abbreviated version of what has been presented in the PCTC DQA challenge filed on September 18, 2013 (see fn 2, supra).

WHAT EFFECT HAVE BANS HAD ON STREAMS?

Although they are in a very small minority, a few places outside of Washington State and Minnesota have implemented RTS bans. As indicated above, the first to do so was Austin, Texas back in 2006. As a result, Austin is an ideal spot to determine if its ban has had any impact on actually reducing the levels of PAHs in sediment.

Such a study was published in a peer reviewed article in 2010 titled**, "**PAHs in Austin Sediments after a Ban on Pavement Sealers."[63] PAH concentrations were measured in stream sediments collected before and after Austin's municipal ban on the use of coal-tar-based pavement sealers. Samples were collected in October 2005 and again in April, 2008, approximately 2.5 years after the ban. Differences in total PAH concentrations between samples collected before and after the ban showed no net change in PAH levels in Austin stream sediments. Furthermore, evaluation of PAH chemical signatures revealed subtle differences in PAH profiles that appeared to reflect the effects of weathering rather than a change in PAH sources. Indeed, the work by DeMott and colleagues was further evaluated by O'Reilly et al. (2013),[64] with the conclusion that RTS was not an identifiable source of PAHs in Austin sediments before or after the ban.

The point to be made is that Exhibit C clearly is encouraging the public to consider bans or alternatives to RTS in the hope that such actions will somehow improve aquatic systems, but there is no valid evidence at this time which demonstrates that such actions will have any impact at all. Rather than raise this issue in a straight forward manner for scientific discussion, the EPA has ignored it. Any mistaken impressions created in Exhibit C along these lines must be corrected.

LIST OF REFERENCES ARE INADEQUATE

The last section of Exhibit C, on page 2, has a limited and incomplete list of five References, each of which has been analyzed in this Request for Correction of Information and shown to be inaccurate or misleading for a variety of reasons. Thus, Exhibit C as it currently exists must be removed from the EPA website. Suggestions for expanding the list of References are attached as Exhibit D. Additional discussions will be needed to determine how the language of Exhibit C must be changed to properly reflect the status of the science that now exists.

Page 2 of Exhibit C also directs the readers to several websites "For More Information." One such site is a Texas USGS website that was, until recently, called "allthingssealcoat." Quietly, this website name and content has been changed in response to objections made by the PCTC in its first DQA challenge on this issue. The problem is that the website is a far cry from being about "all things sealcoat." In reality, it is a website that does little more than self-promote articles authored by Dr. Mahler and Dr. Van Metre of the USGS. Any publication or DQA

[63] 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.
[64] O'Reilly, K., Pietari, J. and Boehm, P. (2013). Parsing Pyrogenic PAHs: Forensic Chemistry, Receptor Models, and Source Control Policy. Integrated Environmental Assessment and Management. DOI: [10.1002/ieam.1506

challenge that question the USGS on the issue of RTS has been ignored at this website as though they did not exist, even peer reviewed articles.

Another link included in the "For More Information" section directs the public to the EPA's June 14, 2012 webinar entitled "Stormwater, Coal-Tar Sealcoat and Polycyclic Aromatic Hydrocarbons." It suffers from the same problems as the "allthingssealcoat" website – all information and studies that challenge the agenda to ban RTS are ignored. Specifically, the website provides access to four PowerPoint presentations given by long time core members of the "ban RTS" affinity group: Barbara Mahler, Allison Watts, Judy Crane and Mateo Scoggins. All of them are advocates for RTS bans, without regard to scientific information that contravenes their advocacy position, and have been pursuing this agenda for many years. Flaws in the scientific analyses offered by each webinar presenter have been repeatedly pointed out in numerous peer reviewed articles and in the three DQA challenges filed by the PCTC in 2013. What is missing from the webinar, of course, is any reference to articles such as those published by O'Reilly and DeMott, or to relevant government studies conducted by the TCEQ, ATSDR and Texas Department of Health. Furthermore, it goes without saying that Drs. O'Reilly and DeMott were not invited by the EPA to speak at this webinar (despite each of them having many PowerPoints of their own on these topics), nor was anyone else contacted who might have been able to share the perspective of industry. One perspective was good enough for the EPA – and that perspective did not involve the stakeholder with the most information about the topic.

All Information Quality Guidelines, from the overarching OMB Guidelines to the Agency-specific EPA Guidelines, clearly assert that this type of bias is not to be tolerated. For this reason, any reference by the EPA to the "allthingssealcoat" web site (recently renamed) and the EPA "Stormwater" webinar should be eliminated from any future EPA publication unless references are made to other websites which contain more complete information regarding RTS. For example, if the two links above are not deleted, at least one additional link should be added to EPA publications which direct readers to the PCTC website.[65] The EPA's Information Quality Guidelines as well as its CADDIS require nothing less. The public and other scientists should be allowed to decide for themselves if the arguments and hypotheses offered by the USGS are valid. Self-serving press releases and websites might be a good way for advocates to pursue a certain agenda and obtain a political victory, but it has nothing to do with good science.

CONCLUSION

The outdated and inaccurate RTS summaries offered by the EPA in Exhibits B and C must be corrected, and quickly. Time is of the essence because policy makers and resource managers across the country are being asked to consider this issue, and they likely will continue to rely upon the EPA to provide them with unbiased and accurate summaries, as well as links to the most current peer reviewed studies and information. These responsibilities assumed by the EPA go far beyond mere citation of USGS websites and publications that have been challenged within various peer reviewed articles.

[65] http://www.pavementcouncil.org/scientific-journals

The first step for the EPA is to remove Exhibits B and C from its websites, immediately, so that appropriate amendments and updates can be implemented with input not only from the USGS, but from industry as well, such as the PCTC. The second step is to draft updated and unbiased summaries regarding the science that now exists with respect to RTS. An important part of that process will be the inclusion of Reference sections and links that allow members of the public to understand the nature and complexities of the scientific debates that are ongoing. EPA knows well how to evaluate science information. CADDIS is just one example of well thought out and comprehensive guidance. The guidance discussed above about realistic evaluations of potential risks to aquatic life from PAHs in sediments is another.

As always, the PCTC stands ready to work with the EPA in disseminating to the public accurate, unbiased and scientifically valid information regarding RTS. PCTC remains hopeful that you will reach out and contact us for this purpose.

Respectfully Submitted,

Anne P. LeHuray

Digitally signed by Anne P. LeHuray
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