Peer Review Summary Document

(11/9/2012)

Peer Review Plan

http:// www.usgs.gov/peer_review/docs/coal_tar_sealants_and_cancer_risk.pdf [18 KB PDF]

Title and Authorship of Information Product Disseminated

Cancer Risk from Incidental Ingestion Exposures to PAHs Associated with Coal-Tar-Sealed Pavement, By E. Spencer Williams, Barbara J. Mahler, and Peter C. Van Metre.

Peer Reviewers Expertise and Credentials

Reviewer #1: Holds an undergraduate degree from Old Dominion University and doctoral degree from North Carolina State University, with a major in toxicology and a minor in molecular technology. The reviewer's postdoctoral position was in the Environmental Carcinogenesis Division, Research Triangle Park, NC and the University of Tennessee Health Science Center, Department of Physiology. The reviewer has conducted basic research studies of the toxicology and carcinogenicity of drinking water disinfection by-products, industrial chemicals, drinking water concentrates ('mixtures') and other toxic substances. The reviewer has over 12 years of in vitro and in vivo toxicology laboratory and field experience. Since joining the U.S. Geological Survey in 2011, the reviewer has conducted short-term toxicity and anchorage-independent growth assays using environmental samples collected from mountaintop removal areas in West Virginia. The reviewer is well-versed in sample collection, assays, and data analysis for toxicity and carcinogenicity testing using environmental air, water, soil and chemical exposures. The reviewer has published 15 articles in the peer-reviewed literature, as cited by Scopus, and a Scopus *h*-index of 8.

Reviewers #2-5: Are four anonymous peer reviewers chosen by the scientific journal *Environmental Science and Technology*. The reviewers were selected on the basis of the subject matter of the paper, the experts available in a given area, and knowledge of the habits of proposed reviewers (*Environ. Sci. Technol.*, vol. 23, no. 1, 1989, p. 30).

Charge Submitted to Peer Reviewers

The reviewers were asked to make an objective evaluation of the research, with particular emphasis on the interpretation and discussion of results. They were notified that the subject matter could receive attention on a nationwide scale and be scrutinized at a high level of detail.

Summary of Peer Reviewers Comments

Reviewer #1: Found this to be an extremely interesting and well-written manuscript that provides important and meaningful data that are of immediate interest to benefit human health and will be of interest to both specialists and the general population. The reviewer also noted that it provides a sound basis for the choice of the analytical methods and values used to model risk. The reviewer's principal suggestions were that the authors provide a hypothetical scenario for a low but non-zero ingestion rate for outdoor (pavement) dust and

that an estimate of inhalation be included, as these two factors could increase the risk substantially. The reviewer also suggested that the manuscript discuss data on bioavailability of PAH and "weathering" over time, and the possible effect on risk. As a final comment, the reviewer recommended that the amount of risk incurred in childhood be noted in the concluding remarks of the Abstract, and also be considered for inclusion in the title, as the amount of risk in the early years of life is a major finding.

Peer Reviewer #2: Found this to be a well-written, fairly straightforward, and unique analysis that is worthy of publication. The reviewer noted that the section on uncertainty was comprehensive and responsible. The reviewer suggested that, given the clarity of the deterministic analysis and the many scenarios modeled, the probabilistic analysis be moved into the Supplemental Information, but left it as a judgment call to the authors. The reviewer also suggested that analyses of inhalation and dermal exposure pathways be included.

Peer Reviewer #3: Stated that the risk assessment work is a nice addition and a logical extension of the authors' previous work, and that the manuscript is clearly written and well organized. The reviewer found the study to be very thorough with ample references and justification given for all of the values selected for inclusion in the risk assessment. The reviewer noted that the comprehensive discussion of sources of uncertainty lent further confidence to the outcome of the analyses. The reviewer also made suggestions for minor editorial revisions.

Peer Reviewer #4: Considered the paper to be well-written and scientifically sound, and that it makes a convincing case elevated exposure to PAH associated with proximity to coal-tar-sealed pavement is associated with a significant increase in excess lifetime cancer risk. The reviewer had no suggestions for revision.

Peer Reviewer #5: Commented that this paper represents the next step in the research on coal-tar-sealed pavement. The reviewer felt that the use of non-parametric statistics would be more appropriate for the data used, and also made suggestions for minor editorial revisions.

Summary of USGS Response to Peer Reviewer Comments

Almost all editorial revisions suggested by the reviewers were incorporated into the manuscript, which strengthened the overall clarity. In response to Reviewer #1's request for a hypothetical scenario for ingestion of pavement dust, the authors generated a scenario for ingestion of 4 to 8 mg of pavement dust for children 0 to 6 years of age and incorporated it into the text. In response to Reviewer #1's comments regarding bioavailability, the authors chose the default of 100% as no site-specific data are available, but further discussion of this issue has been added to the section on uncertainty. In response to Reviewer #1's comment regarding highlighting the importance of childhood exposure, the authors have added a sentence to this effect to the final part of the Abstract. In response to Reviewer #2's comment regarding relegation of the probabilistic analysis to the Supplementary Information, the authors felt that because these types of calculations have become standard practice, the probabilistic analysis should be retained in the body of the text. In response to Reviewer #1 and 2's suggestion for analysis of additional exposure pathways (non-dietary ingestion of pavement dust, inhalation, and dermal exposure), the authors responded that these additional analyses were outside the scope of this assessment for a variety of reasons (e.g., a lack of published ingestion rates for pavement dust), but that these are avenues of current research. In response to Reviewer #5's comment regarding a preference for non-parametric statistics, the authors used the non-parametric

Mann-Whitney Wilcoxon rank sum test; the use of this test did not change any of the conclusions on statistically significant differences.

The Dissemination

The product will be published as an article in *Environmental Science and Technology* and will be available at http://pubs.acs.org/journal/esthag.