

Letter Health Consultation

Review of stormwater retention basin and outfall data samples

KOPPERS INDUSTRIES, INC.

NORTH LITTLE ROCK, PULASKI COUNTY, ARKANSAS

EPA FACILITY ID: ARD006344824

AUGUST 15, 2008

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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LETTER HEALTH CONSULTATION

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Prepared By:

Arkansas Department of Health and Human Services
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry



Arkansas Department of Health

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Governor Mike Beebe

Paul K. Halverson, DrPH, FACHE, Director and State Health Officer

July 3, 2008

Eric Fleming
Water Division
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

Dear Mr. Fleming:

On the basis of a review of the three Koppers Industries, Inc. (Koppers) stormwater retention basin and outfall data samples we received via e-mail from your office on May 5, 2008, the Arkansas Department of Health (ADH), in a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), has prepared this health consultation letter to address any potential public health issues related to the data evaluation. The purpose of this health consultation letter is to provide an accurate and timely scientific-based evaluation of the limited data available from the three stormwater outfall samples collected from the drainage ditches and pond discharge leaving the Koppers facility.

Background and Statement of Issues

After heavy rainfall events this spring, a private citizen requested the Arkansas Department of Environmental Quality (ADEQ) Water Division to sample stormwater from the ditches draining off the Koppers property adjacent to the neighborhood streets. This request was similar to a previous request made by the same citizen in May 2007, in which a Health Consultation (from August 2007) concluded that there was no apparent public health hazard from the Koppers stormwater retention basin on Van Street [1].

In the spring of 2008, a total of three stormwater samples were taken. The first stormwater outfall location (Sample ID "Outfall 001") is on the southwest corner of the Koppers facility, and it is adjacent to a wooded area away from the surrounding communities. The second stormwater location was from the stormwater retention basin [i.e., a pond used as an engineering control on the property to retain surface water] (Sample ID "Outfall 002") and is on the east side of the facility. The third stormwater outfall location (Sample ID "Outfall 003") is on the northeast side

of the facility. Samples "002" and "003" are adjacent to Van Street and the Poe Addition and Glenview communities. Samples "001" and "003" were taken from the drainage ditches as they left the Koppers property. Sample "002" was taken from the stormwater retention pond discharge on Van Street. The locations of these samples can be seen in the figure you e-mailed our offices on May 9, 2008, shown here as Attachment 1.

Once the samples were analyzed in the ADEQ laboratory by the Technical Services Division, our office received the data results, as well as the request to review the data for potential public health effects to the children within the communities surrounding Koppers.

Discussion

The evaluation began with the comparison of the concentrations of detected semi-volatile organic compounds (SVOCs) to the health-based comparison values provided by ATSDR and by the U.S. Environmental Protection Agency (EPA). Comparison values are doses or substance concentrations set well below levels that are known or anticipated to result in adverse health effects. The majority of the compound concentrations from the Koppers stormwater retention basin and outfall sample data was well below comparison values, and was deemed to not represent a likely public health hazard.

Sample "Stormwater Outfall 001" had four compounds above the health comparison values: benzo[a] anthracene, benzo(a)pyrene, chrysene, and indeno[1-2-3-cd]pyrene. All four of these chemicals are listed in a group of chemicals called polycyclic aromatic hydrocarbons (PAHs). Sample "Stormwater Outfall 002", the stormwater retention basin sample, had the same four PAHs and one other SVOC to be above health comparison values: benzo[a]anthracene, benzo(a)pyrene, chrysene, indeno[1-2-3-cd]pyrene, and N-nitroso-di-n-propylamine. Sample "Stormwater Outfall 003" had no exceedances of PAHs or other SVOCs. It is of interest to note the "Stormwater Outfall 003" sample location is on the northeastern side of the Koppers facility (adjacent to Van Street), and is the closest stormwater sample location to the near-by elementary school within the community.

Further screening of the PAHs and SVOCs that were recognized to exceed comparison values was conducted by calculating an exposure dose using the most plausible exposure assumptions. Because the stormwater sampled here comes indirectly from the Koppers stormwater retention basins and drainage discharge points on-site, as well as from off-site road run-off and rain events which cause dilution of the compounds in the water, pathways for accidental ingestion or dermal (skin) contact for a child were evaluated. The most likely scenario of contact with this diluted stormwater is a child from the community playing around the road ditches and possibly falling in the ditch by accident when it contained a small level of surface water (most likely one to six inches of standing water).

For the accidental ingestion pathway evaluation, the assumptions used in the calculations included: a contaminant concentration based on the ADEQ laboratory reports; an ingestion rate of 1.7 fluid ounces per day; an exposure factor (unitless); and a body weight of 29.2 kilograms [(kg) or 64 pounds] for a child (age 5 to 11). For the dermal pathway evaluation, the assumptions used in the calculations included: a contaminant concentration based on the ADEQ laboratory reports; a permeability coefficient in centimeters per hour (cm/hr) for the

contaminant; a conversion factor (unitless); an exposure time of three hours per year; a body weight of 29.2 kg for a child; and an exposed body (skin) surface area of 7280 cm² for a child (which assumes full-body contact). All exposure assumptions were based on the EPA Exposure Factors Handbook for a child swimmer scenario [2, 3].

These resulted in a calculated exposure dose (ED) in units of milligram per kilogram per day (mg/kg/day), which was then used to calculate potential carcinogenic risk values for each compound and each exposure pathway. Theoretical lifetime cancer risk probabilities were considered using an exposure duration of one day per month for six months and a cancer slope factor referenced from the EPA Region 6 Human Health Medium Specific Screening Levels table. For further estimation of the potential theoretical cancer risk posed by multiple PAHs within the water for the ingestion and dermal exposure pathways, a cumulative risk analysis of total PAHs was also analyzed.

To characterize potential carcinogenic effects from accidental ingestion or dermal (skin) contact of compounds directly from the Koppers stormwater retention basin and outfall samples, ATSDR's Toxicological Profile and Health Assessment Toolkit (TopHat) was used [4]. TopHat is a software program that provides the health assessor a means by which one can take site-specific chemical levels and estimate a *theoretical* excess cancer risk expressed as the proportion of a population that may be affected by a carcinogen during a lifetime of exposure.

Risks greater than one in 1,000,000 (or 1×10^{-6}), which represents no theoretical risk of cancer, but less than one in 10,000 (or 1×10^{-4}) are within the U.S. EPA's target risk range and considered an adequate level of health safety. If the additional theoretical lifetime cancer risk is greater than one in 10,000, it is generally considered an indicator that further evaluation would be warranted. The estimated theoretical cancer risk for a child (age 5 – 11, which may be considered more sensitive to contaminated environmental media, and therefore the most conservative population group evaluated here) was calculated for the accidental ingestion and dermal pathways for all SVOCs that were found to be higher than health comparison values.

The average estimated possible cancer risk for benzo[a]anthracene, benzo(a)pyrene, chrysene, indeno[1-2-3-cd]pyrene, and N-nitroso-di-n-propylamine by both accidental ingestion and dermal pathways were all calculated, both for individual theoretical risk as well as cumulative theoretical risks of the total PAHs [5]. See Table 1 and Table 2 for specific values of each chemical and pathway.

Table 1. Koppers Stormwater Retention Basin and Outfall Data Evaluation for Accidental Ingestion* (Sampled 4/21/08)

Sample ID	Compound	Concentration µg/L	Comparison Value** µg/L	Receptor	Theoretical Lifetime Cancer Risk (TLCR)
Stormwater Outfall 001	Benzo[a]anthracene	13.9	0.029	Child	4.0×10^{-9}
Stormwater Outfall 001	Benzo(a)pyrene	3.72	0.0029	Child	1.1×10^{-8}
Stormwater Outfall 001	Chrysene	18.9	2.9	Child	5.3×10^{-11}
Stormwater Outfall 001	Indeno[1-2-3-cd]pyrene	6.24	0.029	Child	1.8×10^{-9}
Stormwater Outfall 002	Benzo[a]anthracene	8.64	0.029	Child	2.5×10^{-9}
Stormwater Outfall 002	Benzo(a)pyrene	2.28	0.0029	Child	6.5×10^{-9}
Stormwater Outfall 002	Chrysene	8.46	2.9	Child	2.3×10^{-11}
Stormwater Outfall 002	Indeno[1-2-3-cd]pyrene	3.78	0.029	Child	1.1×10^{-9}
	Cumulative Polycyclic Aromatic Hydrocarbon TLCR				2.7×10^{-8}
Stormwater Outfall 002	N-Nitroso-di-n- propylamin	11	0.0093	Child	3.0×10^{-8}

*Intake Rate of contaminated water for accidental ingestion calculated as 4 fluid ounces per day

**Comparison Value is EPA Region 6 Human Health Medium Specific Screening Level for Tap Water
µg/L = microgram per liter

Table 2. Koppers Stormwater Retention Basin and Outfall Data Evaluation for Dermal (Skin) Contact (Sampled 4/21/08)

Sample ID	Compound	Concentration µg/L	Comparison Value* µg/L	Receptor	Theoretical Lifetime Cancer Risk (TLCR)
Stormwater Outfall 001	Benzo[a]anthracene	13.9	0.029	Child	9.3×10^{-11}
Stormwater Outfall 001	Benzo(a)pyrene	3.72	0.0029	Child	3.7×10^{-10}
Stormwater Outfall 001	Chrysene	18.9	2.9	Child	1.3×10^{-12}
Stormwater Outfall 001	Indeno[1-2-3- cd]pyrene	6.24	0.029	Child	8.8×10^{-11}
Stormwater Outfall 002	Benzo[a]anthracene	8.64	0.029	Child	5.8×10^{-11}
Stormwater Outfall 002	Benzo(a)pyrene	2.28	0.0029	Child	2.3×10^{-10}
Stormwater Outfall 002	Chrysene	8.46	2.9	Child	5.7×10^{-13}
Stormwater Outfall 002	Indeno[1-2-3- cd]pyrene	3.78	0.029	Child	5.3×10^{-11}
	Cumulative Polycyclic Aromatic Hydrocarbon TLCR		8.9×10^{-10}		
Stormwater Outfall 002	N-Nitroso-di-n- propylamin	11	0.0093	Child	3.8×10^{-11}

*Comparison Value is EPA Region 6 Human Health Medium Specific Screening Level for Tap Water
µg/L = microgram per liter

Conclusions

At the highest level of all SVOCs detected in the three Koppers stormwater retention basin and outfall sample locations, the theoretical carcinogenic risk assessment was found to fall well below the EPA's acceptable target risk range of 1×10^{-6} through 1×10^{-4} , both for individual compound values and for the cumulative risk of total PAHs for accidental ingestion and dermal absorption. Based on the data review and the limited time or unlikely event that a child would be exposed to the stormwater, in addition to the built-in protective standards that the EPA values used in this evaluation provide, there is an insignificant potential risk for adverse health effects from the concentration of the SVOCs that were evaluated for either accidental ingestion or skin contact. Therefore, there is ***no apparent public health hazard*** associated with any of the SVOCs detected in the Koppers stormwater retention basin and outfall samples "001", "002", or "003".

As defined by ATSDR, this public health hazard category applies to sites where exposure to site-related compounds might have occurred in the past or is still occurring, but *the exposures are not at levels likely to cause adverse health effects.*

Recommendations

ADH/ATSDR has no additional actions to recommend regarding the Koppers stormwater retention basin and outfall data at this time.

References

1. Agency for Toxic Substances and Disease Registry (ATSDR) Health Consultation: Stormwater Retention Basin Sampling Results, Koppers Incorporated Site. August 31, 2007.
2. U.S. Environmental Protection Agency (EPA). Risk assessment guidance for Superfund. Human health evaluation manual: Part A. Interim Final. Washington, DC: Office of Solid Waste and Emergency Response.
<<http://www.epa.gov/superfund/programs/risk/ragsa/index.htm>> Available from NTIS, Springfield, VA; PB-90-155581. 1989.
3. U.S. Environmental Protection Agency (EPA). Exposure factors handbook. Washington, DC: Environmental Protection Agency, Office of Research and Development. EPA/600/P-95/002Fa,b,c. 1997.
4. Agency for Toxic Substances and Disease Registry (ATSDR) *TopHat Tool*. Exposure Dose Calculator. 2008.
5. Arkansas Department for Environmental Quality. "Certificate of Analysis" Laboratory Reporting Data. April 21, 2008.

If you have any questions regarding this evaluation, please feel free to contact me at 501-280-4041 or ashley.whitlow@arkansas.gov.

Sincerely,



Ashley Whitlow, M.S.
ADH Sr. Epidemiologist
ATSDR Health Assessor
Environmental Epidemiology

cc: Lori Simmons, M.S., Section Chief for Environmental Epidemiology, ATSDR Program Manager, ADH
Carrie Poston, B.S., CHES, ATSDR Public Health Education Supervisor, ADH
Jeff Kellam, M.S., Division of Health Assessment and Consultation, Technical Project Officer, ATSDR

Attachment 1: Koppers Industry, Inc. Yellow markers represent stormwater outfall samples “001” and “003” and stormwater retention basin outfall sample “002”. Figure provided by the Arkansas Department of Environmental Quality (ADEQ) Water Division.



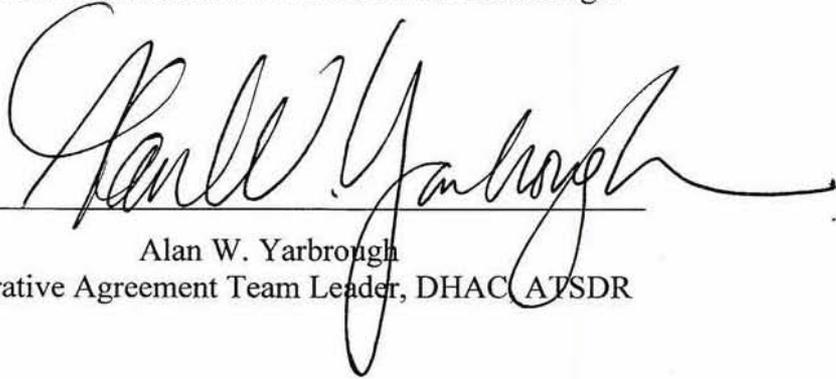
Certification

The Arkansas Division of Health prepared this health consultation for the Koppers Inc. facility under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodology and procedure existing at the time the health consultation was initiated. Editorial review was completed by the cooperative agreement partner.



Jeff Kellam
Technical Project Officer
Division of Health Assessment and Consultation (DHAC)
ATSDR

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.



Alan W. Yarbrough
Cooperative Agreement Team Leader, DHAC, ATSDR