

# **Letter Health Consultation**

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AIR EMISSIONS FROM AMERICAN PACKAGING CORPORATION  
STORY CITY, IOWA

**Prepared by the  
Iowa Department of Public Health**

SEPTEMBER 30, 2009

Prepared under a Cooperative Agreement with the  
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Agency for Toxic Substances and Disease Registry  
Division of Health Assessment and Consultation  
Atlanta, Georgia 30333

## **Health Consultation: A Note of Explanation**

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners 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 or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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LETTER HEALTH CONSULTATION

AIR EMISSIONS FROM AMERICAN PACKAGING CORPORATION

STORY CITY, IOWA

Prepared By:

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



Thomas Newton, MPP, REHS  
Director

Chester J. Culver  
Governor

Patty Judge  
Lt. Governor

August 18, 2009

Catharine Fitzsimmons  
Iowa Department of Natural Resources – Air Quality Bureau  
7900 Hickman Road, Suite 1  
Windsor Heights, IA 50324

RE: Health Consultation  
Air Emissions from American Packaging Corporation – Story City, Iowa

Dear Ms. Fitzsimmons:

This letter has been prepared as a consultation to evaluate human health impacts from air emissions from the American Packaging Corporation (APC) facility located in Story City, Iowa. We understand your concern and the concern of the Story City community, and want you to know that the Iowa Department of Public Health's priority is to ensure that you have the best information possible to safeguard the health of the citizens of Story City. That information is included in the following discussion.

### **Background and Statement of Issues**

You contacted the Iowa Department of Public Health to request assistance in evaluating the results of air dispersion modeling that the Iowa Department of Natural Resources Air Quality Bureau plans to conduct at selected Iowa facilities. The air dispersion modeling being conducted across the state of Iowa is in response to concerns raised by USA Today news articles regarding toxic air emissions and their impacts on nearby schools. This health consultation evaluates the results of air dispersion modeling of hazardous air pollutant emissions from the APC facility in Story City, Iowa.

The Air Quality Bureau of the Iowa Department of Natural Resources uses AERMOD to model emissions from Iowa facilities. AERMOD is an air quality dispersion model preferred by the American Meteorological Society and the U. S. Environmental Protection Agency. AERMOD requires the use of various data inputs to estimate ground-level concentrations of chemicals.

To model emissions from the APC facility, the Air Quality Bureau used site specific data that included:

- meteorological data from the last five years
- terrain data including the buildings and land use around the APC facility
- emission inventory data
- emission stack tests data.

The AERMOD air quality dispersion modeling provided estimates of the concentrations of substances at various distances from the source of the emissions (the APC facility). It also included the estimated

highest concentration during a one-hour time period, the estimated highest concentration during a 24-hour time period, and the estimated average concentration over a one-year time period.

### Emission Rate Determination and Stack Testing

The rates of emissions of hexane, formaldehyde, toluene, benzene, and vinyl acetate from the APC facility were determined by an emissions inventory by staff of the Air Quality Bureau of the Iowa Department of Natural Resources. Under the direction of the Air Quality Bureau of the Iowa Department of Natural Resources, APC also completed stack emissions tests to determine the rate of emissions of methylenediphenyl diisocyanate. Table 1, below, describes the rate of emissions of hazardous air pollutants from the APC facility as determined by the Air Quality Bureau of the Iowa Department of Natural Resources and/ or the APC.

Table 1 – Emission Rate of Hazardous Air Pollutant from American Packaging Corporation (1)

Hazardous Air Pollutant	Emission Point	Emission Rate (lb/hr)
Methylenediphenyl diisocyanate	EP-DB	$2.8 \times 10^{-5}$
Methylenediphenyl diisocyanate	EP-L	$3.2 \times 10^{-5}$
Hexane	EP-DB	$3.0 \times 10^{-6}$
Formaldehyde	EP-DB	$1.0 \times 10^{-7}$
Toluene	EP-DB	$6.4 \times 10^{-9}$
Benzene	EP-DB	$4.0 \times 10^{-9}$
Vinyl acetate	EP-E	$1.17 \times 10^{-6}$

EP – DB is emissions from the laminator #3 stack

EP – L is emissions from the laminator #2 stack

EP – E is emissions from KOP bag machines

### Dispersion Modeling of Ground-Level Concentrations of Hazardous Air Pollutants

The Air Quality Bureau of the Iowa Department of Natural Resources completed dispersion modeling of the emissions of the hazardous air pollutants (Table 1) to determine the ground-level concentrations of these hazardous air pollutants in outside air. As previously discussed, the AERMOD modeling system was utilized to determine estimates of the estimated highest concentrations of hazardous air pollutants during a one-hour time period and during a 24-hour time period, as well as the average concentrations

over a one-year time period. Table 2 shows the maximum modeled concentrations of hazardous air pollutants from emission sources at the APC facility for these given time periods. The maximum modeled concentrations of hazardous air pollutants are located near the sources of emissions at the APC facility.

Table 2 – Maximum Modeled Concentration of Hazardous Air Pollutants (1)

Hazardous Air Pollutant	Modeled Time Period	Concentration ( $\mu\text{g}/\text{m}^3$ ) *
Methylenediphenyl diisocyanate	Peak 1-Hour	$2.29 \times 10^{-3}$
Methylenediphenyl diisocyanate	Peak 24-Hour	$9.0 \times 10^{-4}$
Methylenediphenyl diisocyanate	1-Year Average	$1.0 \times 10^{-4}$
Hexane	Peak 1-Hour	$6.31 \times 10^{-5}$
Hexane	Peak 24-Hour	$2.55 \times 10^{-5}$
Hexane	1-Year Average	$2.61 \times 10^{-6}$
Formaldehyde	Peak 1-Hour	$2.10 \times 10^{-6}$
Formaldehyde	Peak 24-Hour	$8.50 \times 10^{-7}$
Formaldehyde	1-Year Average	$8.70 \times 10^{-8}$
Toluene	Peak 1-Hour	$1.35 \times 10^{-7}$
Toluene	Peak 24-Hour	$5.44 \times 10^{-8}$
Toluene	1-Year Average	$5.57 \times 10^{-9}$
Benzene	Peak 1-Hour	$8.42 \times 10^{-8}$
Benzene	Peak 24-Hour	$3.40 \times 10^{-8}$
Benzene	1-Year Average	$3.48 \times 10^{-9}$
Vinyl acetate	Peak 1-Hour	$3.00 \times 10^{-4}$
Vinyl acetate	Peak 24-Hour	$8.20 \times 10^{-5}$
Vinyl acetate	1-Year Average	$7.91 \times 10^{-6}$

\*  $\mu\text{g}/\text{m}^3$  is micrograms per cubic meter

### Discussion – Exposure to Hazardous Air Pollutants within Outside Air

A comparison can be made between the modeled levels of hazardous air pollutants in the outside air to levels of hazardous air pollutants that are known to have the potential to cause adverse health impacts in individuals. The Agency of Toxic Substances and Disease Registry (ATSDR) and the U.S. Environmental Protection Agency has determined and published a set of comparison values for substances that may be found in air, water and soil. Comparison values (environmental guidelines) are

measures of substance concentrations that are set well below levels that are known or anticipated to result in adverse health effects. Comparison values are determined from studies from known actual human exposures and from studies completed on laboratory animals. Table 3 lists the comparison values for those hazardous air pollutants that were modeled in the vicinity of the APC facility.

Table 3 – Comparison Values for Hazardous Air Pollutants (2)

<b>Hazardous Air Pollutant</b>	<b>Comparison Value (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Exposure Frequency</b>
Methylenediphenyl diisocyanate	0.6	Chronic
Hexane	700	Chronic
Formaldehyde	50	Acute
	10	Intermediate
	0.08 *	Chronic
Toluene	4,000	Acute
	300	Chronic
Benzene	30	Acute
	20	Intermediate
	0.1	Chronic
Vinyl acetate	40	Intermediate
	200	Chronic

“Acute” exposure is less than 14 days

“Intermediate” exposure is between 14 days and 1 year

“Chronic” exposure is greater than 1 year

\* This comparison value corresponds to a less than 1 in 1-million risk of developing cancer.

It is important to match the modeled concentrations of hazardous air pollutants with the appropriate comparison value. The peak 1-hour modeled concentration is most appropriately paired with the acute exposure comparison value, the peak 24-hour modeled concentration is most appropriately paired with the intermediate exposure comparison value, and the 1-year average modeled concentration is most appropriately paired with the chronic exposure comparison value.

As you can see by comparing the values in Table 2 and Table 3, the levels of all of the modeled concentrations of all hazardous air pollutants in the vicinity of the APC facility are well below all comparison values. The modeled concentration of the hazardous air pollutant that is closest to any comparison value is the modeled 1-year average concentration for methylenediphenyl diisocyanate and

that concentration is 6,000 times lower than its chronic comparison value. Since comparison values are set well below levels that are known or anticipated to result in adverse health effects, and the modeled concentration of hazardous air pollutants are below comparison values, the Iowa Department of Public Health concludes that exposure to modeled levels of hazardous air pollutants generated by APC will not adversely affect the health of any person living in Story City, Iowa.

### **Conclusions**

The Iowa Department of Public Health concludes that exposure to chemicals emitted from the APC facility and those chemicals present in the outside air, will not harm the health of people living in Story City, Iowa. The modeled level of exposure to these chemicals is below the levels that are known to impact human health.

### **Recommendations**

The Iowa Department of Public Health understands that the U.S. Environmental Protection Agency will be conducting monitoring of methylenediphenyl diisocyanate in outside air at the Roland-Story High School located in Story City, starting in August 2009. The Iowa Department of Public Health recommends that an additional health consultation be prepared to evaluate the results of that monitoring effort.

### **References**

1. Emissions Testing and Modeling Results, Iowa Department of Natural Resources – Air Quality Bureau, April, June, and August 2009.
2. Agency for Toxic Substances and Disease Registry. Comparison Values. Atlanta: US Department of Health and Human Services; July 2009.

If you have any questions regarding the information in this letter, please contact me at (515) 281-8707 or by email at [sschmitz@idph.state.ia.us](mailto:sschmitz@idph.state.ia.us).

Sincerely,

Stuart C. Schmitz, M.S., P.E.  
Principal Investigator / Environmental Toxicologist  
Hazardous Waste Site Health Assessment Program



## CERTIFICATION

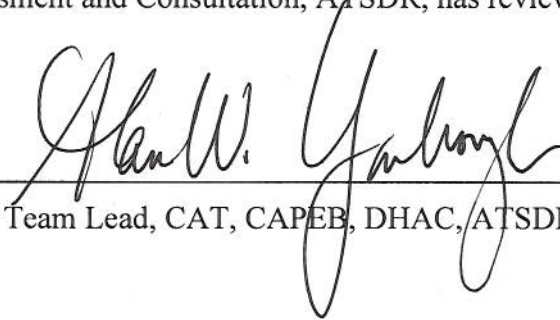
The Iowa Department of Public Health, Hazardous Waste Site Health Assessment Program, has prepared this letter health consultation evaluating human health impacts from air emissions from the American Packaging Corporation (APC) facility in Story City, Iowa under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). The document is in accordance with approved methodology and procedures existing when the health consultation was being prepared. The editorial review of this document was completed by the cooperative agreement partner.



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Technical Project Officer, CAT, CAPEB, DHAC, ATSDR

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



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Team Lead, CAT, CAPEB, DHAC, ATSDR