

Dragon, Karen E. (CDC/NIOSH/EID)

From: Lisa Goldberg [Lisa.Goldberg@aia-aerospace.org]
Sent: Friday, February 18, 2011 3:44 PM
To: NIOSH Docket Office (CDC)
Subject: 161-A - Occupational Exposure to Carbon Nanotubes and Nanofibers
Attachments: AIA comments on Draft NIOSH Report on Carbon Nanotech and Nanofibers.pdf

Please find attached AIA Comments on the referenced report.

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February 18, 2011

NIOSH Mailstop: C-34
Robert A. Taft Lab.
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The Aerospace Industries Association of America (AIA) appreciates the opportunity to provide comments on appreciates the opportunity to provide comments on the National Institute for Occupational Safety and Health (NIOSH) draft Current Intelligence Bulletin (CIB) *Occupational Exposure to Carbon Nanotubes and Nanofibers*, Docket Number: NIOSH 161-A. AIA represents the leading manufacturers of civil, military, and business aircraft, helicopters, unmanned aerial vehicles, space systems, aircraft engines, missiles, and related components, equipment, services, and information technology.

AIA believes that industry and government should be guided by the best available science and established medical practice that provides the most effective opportunity to protect human health based on actionable data. In the absence of data, AIA recommends developing policies that are protective of human health but that do not stifle the development of materials and technologies that may revolutionize industries and create great economic benefit to the United States.

It is in this context that AIA offers the following comments.

Medical Screening and Surveillance

In the draft document, NIOSH recommends B-reading of films for a pneumoconiosis that has not been identified and does not exist in a clinical sense to date. AIA believes a more effective approach would be to require a Board Certified Radiologist or Pulmonologist review the films, since they are trained to recognize findings of lung disease of many types. This would allow for recognition of subtle findings that might not be specified in any known occupational lung disease/pneumoconiosis.

Since there is not a recognized human disease from carbon nanotube (CNT) or carbon nanofiber (CNF) exposure, there is no rationale for comparing films from workers exposed to CNT/CNF with the ILO guidelines and films. There is no evidence that these guidelines and films will be beneficial in distinguishing lung disease resulting from CNT/CNF exposure.

Finally, the ILO/B-reader requirement places additional burden on employers to find radiology facilities that do not use digital radiography. This may be a challenge since most facilities are switching to digital radiography. Allowing employers to send employees for digital radiography will promote compliance with this guidance, while requiring B-reading of film x-rays will not.

Sampling Methodology

AIA believes that the NIOSH recommendation to establish a 7ug/m3 REL based on NIOSH Method 5040 suffers from two significant shortcomings.

First, Method 5040 is not specific for CNT or CNF, but rather is a test for elemental carbon. Depending on this method alone will result in an overestimation of exposure. The discrepancy between CNT/CNF and measured elemental carbon cannot be estimated, but instead will vary according to the materials, tasks and the general operating conditions in which the tasks are performed.

Also, NIOSH indicates 7ug/m3 is at the upper Limit of Quantitation (LOQ). However, LOQ is dependent on a number of factors such as sample volume, filter size and sample portion analyzed. NIOSH suggests that the following sample volumes based on flow rate and sample period are necessary to quantify the elemental carbon that is used as a surrogate for CNT/CNF. Examples of sampling periods and flow rates (l pm = liters per minute) required for collection of recommended air volumes (green area below) are listed in the following table:

Air volume (m ³) over indicated sampling period (hours)				
Flow rate (lpm)	1	2	4	8
2	120	240	480	960
4	240	480	960	1920
6	360	720	1440	2880
7 ^a	420	840	1680	3360

^a Highest flow rate tested at NIOSH laboratory. Tested with Leland Legacy pump, 8-hour sampling period and 25-mm quartz-fiber filter.

If the tasks of interest are less than four hours at the typical sampling flow rate of 2 liters per minute, it will be unlikely that the an accurate exposure assessment would be possible. At four liters per minute, a task would have to take place for at least 2 hours in order to obtain a useful sample.

The animal studies used to derive the REL suffer from significant limitations. As NIOSH points out in Section 5 page 41 "There remains some uncertainty in extrapolating respiratory effects observed in short-term or subchronic animal studies to the potential for causing chronic respiratory effects in humans. Based on currently available data, it is difficult to assess the relative potency of the various types of CNT and CNF because there has been limited systematic study of multiple types of CNT and CNF using the same study design." And, as pointed out earlier comments, the air monitoring method is of limited value in measuring

exposure to CNT and CNF. On page 42 of Section 5 NIOSH states "Measurement results from NIOSH Method 5040 should provide a reasonable estimate of worker's respirable exposure to CNT and CNF ... when the predominant workplace exposure to EC material is CNT or CNF. For these reasons AIA believes that NIOSH should set a REL only when it has sufficient data (and adequate sampling/analytical methodology) to set a limit that is protective of worker health.

Recommendations

In general terms, the recommendations presented (beginning on page 8) are sensible and already in place in many AIA member companies. However, AIA would like to respond to some specific recommendations below:

NIOSH Recommendation: When possible, substitute a non-hazardous or less hazardous material for CNT and CNF when feasible. When substitution is not possible, use engineering controls as the primary method for minimizing worker exposure to CNT and CNF.

AIA Response: For many aerospace applications, the CNT and CNF used by AIA members are the only materials available for the specific use required and it is not feasible to substitute a non-hazardous or less hazardous material. AIA agrees that engineering controls should be the primary method for minimizing worker exposure.

NIOSH Recommendation: Provide facilities for showering and changing clothes, with separate facilities for storage of non-work clothing, to prevent the inadvertent cross-contamination of non-work areas (including take-home contamination).

AIA Response: Providing facilities for showering and changing clothes may not be possible at some sites. AIA agrees that precautions need to be taken to prevent cross-contamination, and believes this can be accomplished through engineering controls.

NIOSH Recommendation: Use light-colored gloves, lab coats, and work bench surfaces to facilitate observation of contamination by dark CNT and CNF.

AIA Response: Observation of contamination by dark CNT and CNF will be virtually impossible unless there is a large amount of the contaminate present (for example, if suspended in a drop of liquid).

Other Comments

AIA offers the following comments on the sections identified below:

1.1 Worker participation (p. 10)

AIA believes that medical screening is an important issue. However, line item b) assumes that a work area is constantly being monitored and that the process would observe an excursion in concentrations in excess of the REL. The methodology specified in method 5040 is not real time and AIA questions its validity for measuring and monitoring CNTs and CNFs.

6.2 Engineering controls (p. 48)

AIA supports this section. Engineering controls will be critical, especially if appropriate monitoring and sampling methods are still being developed.

- 6.4-6.6 AIA supports the use of personal protective clothing and respirators if engineering controls are proven not to be sufficient to protect employee health.

Conclusion

AIA and its members look forward to working with NIOSH to contribute to the orderly, safe and environmentally responsible development of nanotechnology in the United States.

Sincerely,

A handwritten signature in black ink, appearing to read "Lisa Goldberg", with a long horizontal line extending to the right.

Lisa Goldberg
Director, Environment, Safety & Health