

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

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**From:** bruce@thelippygroup.com  
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**To:** NIOSH Docket Office (CDC)  
**Cc:** Chen, Jihong (Jane) (CDC/NIOSH/EID) (CTR)  
**Subject:** 161-A - Occupational Exposure to Carbon Nanotubes and Nanofibers Comments

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### Comments

I would like to congratulate NIOSH for taking the lead among federal agencies in trying to quantify the health risks posed by carbon nanotubes and nanofibers and set a Recommended Exposure Limit. Having had the opportunity to follow the efforts of the NEHI working group of federal agencies, I have been impressed with the commitment to focus the research on the health implications of engineered nanoparticles where the most pressing questions still exist. Unfortunately, there are many remaining.

This NIOSH Current Intelligence Bulletin is comprehensive and extremely well written. It stands as a major addition to the international literature on the health and safety risks posed to workers by carbon nanotubes and nanofibers. Not only is the research strong, but the entire NIOSH nanotechnology team is readily accessible to others in the field, starting with Dr. Charles Geraci.

I would make the following recommendations on strengthening the document:

1. Provide more consideration of workers other than those directly involved in manufacturing the nanotubes or incorporating them into products. There are many construction workers who will be handling products that contain nanotubes that currently don't need any labeling. The presence of these materials in the waste stream will expose many other workers.
2. Consider adding stronger conditional language about the limitation of using a mass-based REL. The current document correctly points out that the TEM/SEM counting protocols for carbon nanotubes are not sufficiently standardized, but the limitations to a mass-based approach argues for more clearly identifying the preference for a counting protocol. One is under develop by ASTM. The great fear is that a mass-based REL will remain due to regulatory inertia.
3. Give worker training more focus. Currently, the current language and location within the section on medical surveillance, it feels like an older NIOSH Criteria document. Kristen Kulinowski and I have created a guidance of training workers through the National Institute of Environmental Health Sciences that has gotten excellent and substantial review by NIOSH. It should at least be noted.
4. More strongly address the woeful nature of Material Safety Data Sheets for carbon nanotubes.
5. Consider adding warning language to all nanomaterials so workers

understand what is there.