

**SCOPE OF WORK: Review of Safety Practices in the Nanotechnology Industry:  
A Proposal to the International Council on Nanotechnology (ICON)  
from the University of California, Santa Barbara**

Patricia A. Holden, Ph.D., Principal Investigator, Barbara Herr Harthorn, Ph.D., Co-Principal Investigator, Richard Appelbaum, Ph.D., Co-Principal Investigator, Magali Delmas, Ph.D., Co-Principal Investigator

In response to the ICON RFP entitled "Review of Best Practices for Nanotechnology Safety", the project team will review current initiatives developing recommendations on the safe manufacture and use of engineered nanomaterials, and review and analyze self reported practices currently being developed to manage potential environmental and health risks from production to disposal. To accomplish these objectives, research will be performed regarding the safety practice development efforts and an interview-based survey of current practices for nanomaterial risk management will be conducted. The team will then analyze the results to contribute to the knowledge-base of nanomaterial safety, closing knowledge gaps and developing recommendations for "best practices" in the nanotechnology field. The final product will be a report of the findings that will assist with the development of worldwide nanomaterial safety standards. The final report and data resulting from this project will be made fully available to ICON for public dissemination.

During the Spring of 2006, Stage One of the research will be performed and completed, resulting in development of a searchable database and culminating in the submission of a Stage One report to ICON by early June of 2006. In Stage One, a comprehensive survey will be conducted to learn of ongoing and planned activities by others to summarize current nanotechnology industrial safety practices. Thus, Stage One will reveal if others are already performing or planning in the near future to embark on the research efforts planned for this project in Stage Two. Stage Two will involve conducting telephone-based interviews of nanotechnology companies, as well as disseminating a web-based survey in Europe, to learn of their current industrial safety practices. The ultimate goal of Stage Two is to delineate safety practices within industrial nanotechnology sectors, to organize the information into an understanding of how fully evolved safety practices are, and to identify critical needs for the standardization and implementation of safety practices in the nanotechnology industry in different parts of the globe.

Between 45 and 60 companies will be interviewed during Stage Two from across the U.S., the European Union and East Asia. ICON will assist by providing contact information, and, in some cases, pre-contacting interviewees to facilitate their receptiveness to the UCSB interviewers. The interview instrument will be constructed during Spring 2006 in conjunction with Stage One research and administered during Stage Two over the course of the summer 06. The work will be supervised by the PI and Co-Is, and carried out in part by a Ph.D. student experienced in constructing and conducting interviews of this nature. Masters students in the Bren School who will work as interns during the summer of 2006 will perform most of the interviews and data analysis as well as drafting reports. The activities during Stage Two will include proper documentation, including preparing notes and interview transcriptions with ongoing data extraction and content analysis. Similarities and differences in practices based upon type of organization, field, region, material type (carbon-based, metal-based, composites, and dendrimers) and application (e.g. electronics, environmental, agricultural, health/medical, and cosmetics) will be examined. The findings will be analyzed for effectiveness based upon literature research (e.g. toxicology studies, PPE studies, ILSI report, etc.) and interviews with safety experts. Understanding the effectiveness of current practices will allow understanding the limitations of current practices and provide recommendations for "best practices" based upon material type and application in the workplace. A written final report of Stage 2 activities/results, containing an executive summary aimed at the "lay public", and a searchable database from Stage 1 and Stage 2 activities will be provided to ICON by November 15, 2006.