II. CHARGE TO REVIEWERS

The external review draft of EPA's *Nanomaterial Case Study: Nanoscale Silver in Disinfectant Spray* has been revised based on comments received from workshop participants and the public. NCEA is requesting a letter review of this draft by individuals with expertise in one or more topic areas related to life cycle and risk assessment of nanomaterials. Charge questions to guide the review are listed below. Reviewers should provide detailed responses to each charge question. However, if a question requires a response outside of the reviewer's expertise or general knowledge, then the reviewer may so indicate. Following the review, NCEA staff will revise the case studies to consider comments from the peer reviewers.

Charge Questions:

1. Chapter 1 provides introductory material regarding the CEA approach used in these case studies along with other background information and a discussion of terminology. Is this information accurately and clearly presented? Please comment on the utility of the chapter in providing background and support for the remainder of the document. In particular, are the figures summarizing the CEA framework and process clear? How might this chapter be improved?

2. Chapter 2 presents basic information on conventional silver, including data on usage and historic environmental levels. Information on the physical-chemical properties of nanoscale silver and analytic methods makes up the rest of the chapter. Is this information clear and accurate? How might this chapter be improved?

3. Chapter 3 summarizes information on the lifecycle stages of nano-Ag disinfectant spray products, including potential releases to the environment of nano-Ag and by-products. To what extent does this chapter accurately and sufficiently characterize what is known and what is unknown with regard to the various stages of the lifecycle of nano-Ag as it might be used in disinfectant spray products? To what extent is the material effectively organized and sufficiently informative to support planning for future research? How might this chapter be improved?

4. Information on the transport, transformation, and fate of nano-Ag in air, water, sediment, and soil is discussed in Chapter 4. Please comment on the extent to which this chapter accurately and sufficiently characterizes the state of understanding regarding the known and anticipated behavior of nano-Ag in the environment. To what extent is this information presented in a manner that would inform consideration of likely exposure routes relevant to biota and human health? For each of the environmental media discussed, to what extent is the material effectively organized and sufficiently informative to support planning for future research? How might this chapter be improved?

5. Chapter 5 provides information on exposure, dose, and translocation of nano-Ag in humans and other biota. Please comment on the extent to which this chapter accurately and sufficiently characterizes this information and forms a basis for considering the health and ecological impacts of nano-Ag. To what extent is the material effectively organized and sufficiently informative to support planning for future research? How might this chapter be improved?

6. Chapter 6 characterizes factors that influence ecological and health impacts of nano-Ag and discusses the currently available scientific evidence regarding these impacts. Please comment on the extent to which this chapter accurately and sufficiently characterizes the state of the science. To what extent is the material effectively organized and sufficiently informative to support planning for future research? How might this chapter be improved?

7. Chapter 7 summarizes the information and research questions presented in the nano-Ag case study, as well as discusses the role of case studies in the refinement of research strategies and potential future assessment efforts. We would appreciate comment from the peer reviewers on the integration of evidence in this chapter and its usefulness in supporting future development of research strategies and assessments. How might this chapter be improved?

8. For the document as a whole, are there ways to improve the structure, scope or presentation of information to better support the identification and prioritization of research needs by diverse stakeholders?

9. The case study follows the CEA framework, which combines a product life-cycle perspective with the risk assessment paradigm to support subsequent steps in the CEA process. Please comment on aspects of the CEA framework and process that can be improved in future applications of CEA. We would appreciate input on the overall structure and scope of the framework and process and the extent to which they support the development and refinement of research directions for future CEAs of nano-Ag in particular and nanomaterials in general.