WAM-B.4 INTERNAL RADIATION DOSIMETRY CONSIDERATIONS FOR WORKING WITH RADIOACTIVE NANOMATERIALS: GUIDANCE FROM NCRP REPORT 176 *Guilmette, R., Hoover, M.*; Ray Guilmette and Associates, LLC, National Institute for Occupational Safety and Health;* mhoover1@cdc.gov

Internal dosimetry is the radiation safety program element that could potentially require the most attention due to the use of nano-sized radioactive materials (RNp). In NCRP Report 176 on Radiation Safety Aspects of Nanotechnology, the impact of exposure to RNp versus other sized radioactive materials has been considered from the viewpoints of (1) route of intake (i.e., inhalation, ingestion, wound, dermal), (2) biokinetic behavior in the intake tissues and organs (as well as the systemic organs) after reaching the blood, and (3) the selection and description of target organs and tissues for calculating doses. To address issues with the current models, Report 176 calls for investigations to better understand the behavior (e.g., deposition, biokinetics) of RNp in the body. In addition, new transport pathways and rates for nanoparticle translocation across the air-blood barrier need to be considered for inclusion in a new human respiratory tract model; accumulation of nanoparticles in secondary organs needs to be considered in an updated human respiratory tract model; the modeling of the systemic biokinetic behavior of RNp reaching the blood should be treated discretely from solubilized radionuclides in blood because the uptake, distribution and retention of particulate and soluble radionuclides systemically are often very different; and for chronic exposure conditions that involve nanoparticles, the potential for the accumulation of poorly soluble nanoparticles in secondary organs should be addressed. It is also noted that in future dosimetric models, chemical and particulate dosimetric quantities and factors may need to be evaluated in addition to the more traditional radiological dosimetric quantities for nanomaterials. In addition, the possibility that biological effects may occur as a result of combined insults from the radiological, chemical and particulate properties of RNp should be investigated.

WAM-B.5 WORKING ACROSS RADIATION PROTECTION DISCIPLINES IN THE FACE OF UNCERTAINTIES AND EVOLVING TECHNOLOGIES: SOME INSIGHTS FROM DEVELOPMENT OF NCRP REPORT NO. 176 ON RADIATION PROTECTION ASPECTS OF NANO-TECHNOLOGY *Grissom, M.; MPG--HP, Inc.;*
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As radiation protection professionals, health physicists know a lot about how to protect ourselves, our co-workers, the public, and the environment from radiation-related hazards, exposures, and potentially resulting risks. Part of our knowledge and understanding is based on extensive science and experience. Some of that experience involves knowing how to assess risks and make decisions in the face of uncertainties and evolving technologies. No matter what tasks we undertake, it is second nature for health physicists as a profession to ask: What do we know for sure? What do we need to know more about? and What unknowns might be lurking in the shadows? The recent development of NCRP Report No. 176 on Radiation Safety Aspects of Nanotechnology provided an opportunity for a spectrum of experts to ask those types of questions about an area of study and application that is evolving and promising, but for which we can only imagine the long-term future. This presentation will address some examples of how the writing group for NCRP Report No. 176 grappled with reviewing and documenting the available literature, posing and answering relevant questions about how nanotechnology may differ from traditional radiation research and applications, and how we can systematically