A new approach to assessing the risk of using nanomaterials in industry

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The production and use of nanoparticles in industry provides new opportunities for making advanced materials with unique physical chemical and biological properties. On the other hand, there are increasing concerns over possible human health and environmental risks of nanoparticles. Regarding the human health impacts, it is predicted that the greatest potential for human exposure to nanoparticles in the next few years will be at the workplace. However, the existing methodologies may not be appropriate for assessing the potential risks associated with different kinds of engineered nanoparticles. New regulations and standards on occupational safety for nanoparticle manufacturing have not been developed yet. In addition, the risk assessment and management for nanoparticle production at workplace is very difficult due to limited knowledge of the toxicological properties of different types of nanoparticles and lack of exposure data of nanoparticles at workplace. In spite of all these difficulties and uncertainties, environmental and occupational safety issue need to be included in the development of new nanotechnology-based products to ensure sustainable and responsible development.

At the moment, many of the toxicological studies of nanoparticles are very difficult to compare due to the fact that testing conditions are very different and quite often do not reflect the real situation in a production facility. In order to improve this situation DNV Research & Innovation has initiated an EU project on **Behavior of Aerosols Released to Ambient Air from Nanoparticle Manufacturing,** which is proposed to:

1. *Determine typical* scenarios *of release and transport of airborne nanoparticles in an occupational setting;*
2. *Select model parameters for physical change which airborne nanoparticles will undergo after release until they reach the (human) receptor*
3. *Determine the metrics (= characteristics), by which the sources and changes need to be characterized.*
4. *Design basic experiments to explore the relevance of model parameters of change.*
5. *Identify methodologies for generating test aerosols and measuring the relevant parameters*
6. *Determine the relevance of the identified scenarios based on measurements of parameters of physical change*

The paper will present the exposure scenarios at production sites, model parameters and metrics of nanoparticle aerosols and some preliminary experimental results.