### Questions to Ask Before You Start

- Have you done a job hazard analysis? What is the physical form of the nanomaterial? How much are you using? Can you reduce exposure to the nanomaterial by changing its form (for example, putting powder into a solution) or reducing the amount you are using?

### Here are some options you can use to reduce exposures to nanomaterials in the workplace.

#### DRY POWDER

*(typically highest potential for exposure)*

<table>
<thead>
<tr>
<th>Applies to Dry Powder Nanomaterials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher potential for exposure: Dumping bags of powder, bagging or sieving of products</td>
</tr>
<tr>
<td>Lower potential for exposure: Scooping/weighing of product, transporting containers with light surface contamination or closed barrels/bottles/bags</td>
</tr>
</tbody>
</table>

#### SUSPENDED IN LIQUID

<table>
<thead>
<tr>
<th>Applies to Nanomaterial Suspended in Liquids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher potential for exposure: Spraying, open top sonication, producing a mist</td>
</tr>
<tr>
<td>Lower potential for exposure: Cleaning up a spill, pipetting small amounts, brushing</td>
</tr>
</tbody>
</table>

#### PHYSICALLY BOUND/ENCAPSULATED

*(typically lowest potential for exposure)*

<table>
<thead>
<tr>
<th>Applies to Physically Bound/Encapsulated Nanomaterial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher potential for exposure: Cutting, grinding, sanding, drilling, abrasive blasting, thermal release</td>
</tr>
<tr>
<td>Lower potential for exposure: Manual cutting and sanding, painting with a roller or brush</td>
</tr>
</tbody>
</table>

### Engineering Controls

Based on the form and the work activity, what engineering controls will be effective? What are the key design and operational requirements for the control? How does the non-nanomaterial base material or liquid affect exposure?

#### DRY POWDER

- Chemical fume hood
- Glove box
- Nanomaterial handling enclosure

#### SUSPENDED IN LIQUID

- Ventilated bagging or sieving
- HEPA-filtered local exhaust ventilation

#### PHYSICALLY BOUND/ENCAPSULATED

- Ventilated bagging or sieving
- HEPA-filtered local exhaust ventilation

### Administrative Controls

Have you considered the role of administrative controls? Have you set up a plan for waste management? Have you considered what to do in case of a spill or how you will maintain equipment?

#### DRY POWDER

- Establish a chemical hygiene plan
- Perform routine housekeeping
- Train workers

#### SUSPENDED IN LIQUID

- Use signs and labels
- Restrict access to areas where nanomaterials are used

#### PHYSICALLY BOUND/ENCAPSULATED

- Handle and dispose of all waste materials (including cleaning materials/gloves) in compliance with all applicable federal, state, and local regulations
- Use sealed/closed bags or containers, and secondary containment
- Label containers, such as “contains nanoscale titanium dioxide”

### Personal Protective Equipment

If the measures above do not effectively control the hazard, what personal protective equipment can be used? Have you considered personal protective equipment for the non-nanomaterial base material or liquid?

#### DRY POWDER

- Nitrile or chemical resistant gloves
- Lab coat or coveralls
- Safety glasses, goggles, or face shield

#### SUSPENDED IN LIQUID

- Respiratory protection when indicated and engineering controls cannot control exposures, and in accordance with federal regulations (29 CFR 1910.134)
- NIOSH guidance on respirators can be found at www.cdc.gov/niosh/topics/respirators/

#### PHYSICALLY BOUND/ENCAPSULATED

- Use personal protective equipment during spill cleanups and equipment maintenance