**Hazard Controls**

### Risks
- Acutely toxic BDS can cause systemic toxicity or death if ingested, inhaled, percutaneous, mucous membrane exposure. Examples include: TOXOID/VACCINE, TOXIN, PEPTIDES, and ANTIBODIES.
- Other health hazards (e.g., oncogenic/mutagenic, reproductive effects, respiratory sensitization, and organ damage) and/or irritation of the eyes, skin, or respiratory system could occur.
- Some BDS are suspended in chemicals that have physical or health hazards (not covered by these guidelines). See Chemical Guidelines.
- See chemical Safety Data Sheet (SDS)/Product Information Sheet for specific hazard information.

### Medical Screening
- Some toxins (discuss this with OESO) have acute affects requiring medical review (and/or vaccination or titer) through Employee Occupational Health and Wellness (EOHW) (919-684-3136), Duke Clinic in the sub-basement of the Orange Zone (Room 0320). All personnel have the opportunity to discuss occupational concerns with a medical provider.

### Selection & Purchase
- Purchase the smallest practical amount.
- When possible, order material in liquid form OR in pre-weighed amounts, in a sealed septum-top vial so that diluent can be injected directly into the vial.

### Storage & Transport
- Use a chemical fume hood (CFH) or Class II biological safety cabinet (BSC) when diluting concentrated and highly toxic BDS (stocks) AND if exposure to hazardous aerosols could occur.
- Use a CFH or exhausted BSC (directly vented to the outside) if exposure to hazardous vapors or gases could occur.

### Engineering Controls
- Line CFH/BSC work surface with absorbent, leak-proof bench pads.
- Use safer alternatives (safer sharps devices). See SHARPS MANAGEMENT PLAN.
- Inject diluent through septum-top and immediately dispose of syringe with attached needles into a sharps container located within arm’s reach.
- If absolutely necessary to weigh BDS, place balance in CFH or:
  - Tare (pre-weigh) an empty container with a lid.
  - Go to CFH; add powder to container, close lid before weighing.
  - Return to CFH to before opening lid for other manipulations.
- Use an anti-static gun if powder sticks to sides of vial, etc.
- Eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food for human consumption are not permitted in laboratory areas. Food is stored outside the laboratory area.

### Work Practice Controls
- Use safer alternatives (safer sharps devices). See SHARPS MANAGEMENT PLAN.
- Inject diluent through septum-top and immediately dispose of syringe with attached needles into a sharps container located within arm’s reach.
- Follow solid disp:
  - Go to CFH; add powder to container, close lid before weighing.
  - Return to CFH to before opening lid for other manipulations.
- Use an anti-static gun if powder sticks to sides of vial, etc.
- Eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food for human consumption are not permitted in laboratory areas. Food is stored outside the laboratory area.

### Personal Protective Equipment (PPE)
- Lab coat (or gown/tyeek, etc.) and gloves required. Mucous membrane protection (e.g. safety glasses or face shield) must be used if there’s a potential for splash or spray such as when opening tube and cleaning up spills.
- If SDS indicates "fatal in contact with skin", wear two pairs of nitrile gloves*. *Check the manufacturer’s glove guide for glove effectiveness with any solvents you are using.
- Change gloves immediately, if contaminated.
- Remove PPE and WASH HANDS prior to leaving the work area.

### Cleaning & Decontamination
- Decontaminate the work area using a compatible solvent/inactivating solution.

### Waste
- Solid disposal items:
  - If autoclaving: Place in an autoclavable bag. Close loosely to allow for steam penetration. Place bag in a secondary autoclavable tray/open bin (to prevent or contain leaks) and autoclave for 90 minutes at 121 degrees Celsius, 15 p.s.i. Allow to cool. Place in leak-proof container and transport to the building dumpster. Do not autoclave flammable or corrosive chemicals. See Autoclave Training.
  - If not autoclaving: Follow Lab Chemical Waste Mgt Practice (linked above) for chemical waste.
- Sharps: Activate safety device (if available) and place immediately in puncture resistant sharps container (needle box); close when container is two-thirds filled or sooner. DO NOT attempt to jam used needles into a full container. Follow solid disposal guidelines.

### Emergencies
- See Emergency Response [webpage](#) or flip chart and/or lab specific chemical hygiene plan.

### Spills
- Wear full PPE, including a lab coat, disposable gloves, and full-face protection.
- Pick up sharp items with a mechanical device and place into sharps container.
- Decontaminate the work area using a compatible solvent/inactivating solution.
- Refer to the [Emergency Response Guide](#) and lab-specific chemical hygiene plan/SOP (if applicable) in your work area for more information.

### Exposures
- Remove contaminated clothing and wash skin with soap and water for 1 minute.
- For eye exposures, flush eyes with water from emergency eyewash station for 1 minute.
- Obtain medical attention, if necessary and report to EOHW by dialing the Occupational Exposure Hotline at 919-684-8115.
- Complete the "Report a Work-Related Accident, Injury, or Illness" form at linked hr.duke.edu page.

### Training
- Complete minimum safety training requirements for your job.
- Review/sign tox-specific SOP, if applicable. All personnel shall read and fully adhere to all SOPs.

### Questions
- Contact OESO - Biological Safety Division at 919-684-8822 or biosafety@duke.edu