1.0 Purpose and Scope

This procedure applies to all operations with the potential to generate combustible dusts and describes how combustible dust hazards should be identified and controlled. Combustible dusts are defined by the National Fire Protection Association (NFPA) as “any finely divided solid material…that presents a fire or explosion hazard when dispersed and ignited in air.” Some machining and processing activities involving metals, woods, plastics and other materials may have the potential to generate combustible dusts. The combination of combustible dusts and ignition sources creates the potential for ignition and explosion of combustible dusts.

2.0 Roles and Responsibilities

2.1) **Shop/Lab Supervisors** are responsible for identifying and controlling combustible dust hazards in their operations, and ensuring that all affected personnel are aware of the combustible dust hazards and controls.

2.2) **Environmental Health and Safety Office** assists with evaluation of combustible dust hazards and controls, conducts training, assists with specific concerns/requests, and conducts inspections.

3.0 Hazard Analysis

Shop/Lab Supervisors must conduct a hazard analysis of their work activities and work areas to identify dust explosion hazards. Any area or location with more than a 1/8 inch build-up of combustible dust is considered hazardous. Multiple factors may need to be considered during the hazard analysis of combustible dusts - some examples are listed below. Use proper equipment and safety procedures when inspecting elevated spaces/surfaces.

- A variety of materials can be combustible when finely divided, including dusts generated from the machining/processing of wood, plastics, and combustible metals (e.g., aluminum, titanium, and iron).
- Open areas where combustible dusts may build up should be considered, including floors and horizontal surfaces (e.g., girders and beams).
- Enclosed and hidden areas where combustible dusts may accumulate should be considered, including dust collectors, ductwork, plenums, and enclosed ceiling spaces.
- The potential mechanisms that can disperse dust in air and create a potentially explosive concentration (e.g., ventilation systems, air guns, dry sweeping) should be evaluated.
- Potential ignition sources should be considered, such as grinding, welding, open flames, and electrical equipment.

After the combustible dust hazards are identified, appropriate controls can then be identified and implemented to control/prevent combustible dust fires and explosions.
4.0 General Dust Control Practices

Where feasible and as appropriate, a combination of engineering controls (such as mechanical dust collection systems) and administrative controls (such as routine cleaning, inspection, maintenance) should be implemented. Some general dust control methods are listed below.

- Minimize the escape of dust from dust control equipment and ventilation systems.
- Use approved and properly designed dust collection systems and filters.
- Select/use surfaces that minimize dust accumulation and facilitate cleaning.
- Provide safe access to enclosed/hidden spaces to permit inspection for combustible dust buildup.
- Routinely evaluate dust buildup in open and hidden areas.
- Clean combustible dust residue at regular intervals to prevent dust buildup (do not allow more than 1/8 inch build-up of combustible dust to accumulate).
- Where combustible dusts may be present, avoid cleaning with methods that may create dust clouds; and
- Develop and implement a combustible dust inspection, testing, housekeeping, and control program (preferably in writing with established frequency and methods).

4.1) Control of Ignition Sources

Control ignition sources, such as open flames, grinding, hot equipment, electrical equipment, and static electricity that may be exposed to combustible dust concentrations. As applicable, follow the WHOI Hot Work guideline. When operating, servicing, and maintaining equipment, ensure that proper grounding is in place. For example, hoses, ducts and nozzles that are used to collect, convey, or blow combustible dusts may need to be bonded and grounded to safely dissipate static electricity.

4.2) Cleaning

Create a checklist that identifies all areas that may accumulate combustible dust. Establish a routine cleaning schedule to remove combustible dust from floors, ledges, beams, equipment, or other surfaces. Establish and implement a cleaning frequency that is sufficient to prevent significant buildup of combustible dust. Cleaning methods that do not generate dust clouds are preferred (high-efficiency vacuums that are grounded, wet cleaning methods, etc). Use proper equipment and safety procedures when cleaning elevated spaces/surfaces.

4.3) Mitigation Measures

Based on the hazard assessment and if appropriate, minimize the danger and damage from a combustible dust explosion. This can include various design factors, including isolation, distance, barriers, explosion venting, explosion prevention systems, etc. Please note that damage control precautions may only be appropriate for high-hazard operations involving highly combustible dusts. In general and unless reviewed/approved by the EH&S office, these operations should be avoided.