UTAH LABOR COMMISSION
Utah Occupational Safety and Health Division

DIRECTIVE NUMBER: 2023-1	EFFECTIVE DATE: July 30, 2023
SUBJECT: Local Emphasis Program for Combustible Dust	

ABSTRACT

Purpose: This instruction contains policies and procedures for inspecting workplaces that generate or handle combustible dusts, and for determining whether such workplaces have addressed fire, flash fire, deflagration, and explosion hazards associated with combustible dusts. These dusts include, but are not limited to:

- metal dust such as aluminum, magnesium and some forms of iron dusts
- wood dust
- coal and other carbon dusts, including carbon black
- plastic dust, phenolic resins, and additives
- rubber dust
- biosolids
- other organic dust, such as sugar, flour, paper, soap, and dried blood
- certain textile materials

Scope: This instruction applies UOSH-wide.

References: See Section III.

A. Utah Occupational Safety and Health (UOSH) Field Operations Manual (FOM), May 2020.

B. OSHA Instruction CPL 02-01-004, Inspection of Grain Handling Facilities, 29 CFR 1910.272, November 8, 1996.

C. OSHA Instruction CPL 02-01-038, Enforcement of the Electric Power Generation, Transmission, and Distribution Standard, June 18, 2003.

D. Safety and Health Information Bulletin (SHIB)—Improper Installation of Wood Dust Collectors in the Woodworking Industry.

E. OSHA Regional Administrators Memorandum Evaluating Hazardous Levels of Accumulation Depth for Combustible Dusts, April 21, 2015.

F. OSHA Technical Manual – Combustible Dusts.

Cancellations: None.

Expiration: This directive is active until further notice.

Action Offices: UOSH Compliance and Consultation and Education Services.

Contact: UOSH
160 East 300 South
Salt Lake City, UT 84114
801- 530-6901

Executive Summary

The Occupational Safety and Health Administration (OSHA) initiated their Combustible Dust National Emphasis Program (NEP) on October 18, 2007, following a number of combustible dust incidents that resulted in numerous deaths and many serious injuries. The details of some of these incidents can be found in a report published by the United States Chemical Safety and Hazard Investigation Board (CSB). However, as a result of a catastrophic incident involving a combustible dust explosion at a sugar refinery, OSHA reissued their NEP on March 11, 2008, to increase its enforcement activities in specific industry groups that experienced either frequent combustible dust incidents or had the potential for combustible dust incidents with catastrophic consequences. In fiscal years 2013 to 2017, OSHA conducted 2,553 combustible dust inspections – 910 programmed inspections and 1,253 un-programmed inspections. During this period, the agency found 3,389 combustible dust violations – 1,022 from programmed inspections and 2,367 from un-programmed inspections. During this period, the top five industries with combustible dust hazards were farm suppliers, institutional furniture manufacturers, metal window and door manufacturers, sheet metal work manufacturers, and re- upholstery and furniture repairing operations. Also, during this period, animal food manufacturing, sawmills, wood manufacturing (e.g., cut-stock, re-sawing and planing), and agricultural processing facilities (e.g., grain and field beans) experienced the highest numbers of combustible dust-related fatalities and catastrophes.

In addition, the Combustible Dust Safety Science's Combustible Dust Incident Reports from 2016 to 2018 state that the majority of combustible dust hazards resulting in fires and explosions involved combustible dust generated during the manufacturing and processing of agricultural, food, wood, and metal products. In 2018, wood and food products made up an average of 70 percent of the materials involved in combustible dust fires and explosions. According to the incident reports, the majority of the industries involved in combustible dust hazards are wood processing; agricultural and food production; and lumber production.

The purpose of this local emphasis program (LEP) is to inspect facilities that generate or handle combustible dusts that are likely to cause fire, flash fire, deflagration, and/or explosion hazards.

This directive may apply to facilities covered under the PSM standard that generate or handle combustible dusts, except for PSM-covered explosives and pyrotechnic facilities.

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I. Purpose.

This instruction contains policies, procedures, and guidance for inspecting workplaces that generate or handle combustible dusts that are likely to cause fire, flash fire, deflagration, and/or explosion hazards. These dusts include, but are not limited to:

- metal dust, such as aluminum, magnesium, and some forms of iron dusts;
- wood dust;
- coal and other carbon dusts, including carbon black;
- plastic dust, phenolic resins, toner, and additives;
- rubber dust;
- biosolids;
- other organic dust, such as sugar, flour, paper, soap, and dried blood; and
- certain textile materials.

Industries that generate or handle combustible dusts include, but are not limited to:

- agriculture;
- food products;
- chemicals;
- textiles;
- forest and furniture products;
- metal processing;
- tire and rubber manufacturing;
- paper products;
- 3D printing;
- Pharmaceuticals;
- wastewater treatment;
- recycling operations (metal, paper, and plastic); and
- coal dust in coal handling and processing facilities.

(**Note**: 29 CFR 1910.269(v)(11)(xii) addresses control of ignition sources at coal handling operations in electric power plants. The Mine Safety and Health Administration (MSHA) has authority in some areas involving coal crushing and conveying processes. See OSHA Instruction CPL 02-01-038, dated June 18, 2003, for additional guidance on authority.)

II. Scope.

This instruction applies UOSH-wide.

III. References.

A. UOSH Field Operations Manual (FOM), May 2020.

B. OSHA Instruction CPL 02-01-004, Inspection of Grain Handling Facilities, 29 CFR 1910.272, November 8, 1996.

C. OSHA Instruction CPL 02-01-038, Enforcement of the Electric Power Generation, Transmission, and Distribution Standard, June 18, 2003.

D. Safety and Health Information Bulletin (SHIB)—Improper Installation of Wood Dust Collectors in the Woodworking Industry.

E. OSHA Regional Administrators Memorandum Evaluating Hazardous Levels of Accumulation Depth for Combustible Dusts, April 21, 2015.

F. OSHA Technical Manual – Combustible Dusts.

The following industry standards have been incorporated by reference in OSHA standards, which were incorporated by reference in UOSH's rules.

- NFPA 62-1967 Standard for the Prevention of Dust Explosions in the Production, Packaging, and Handling of Pulverized Sugar and Cocoa, incorporated by reference (IBR) approved for §1910.263(k)(2)(i).

- NFPA 68-1954 Guide for Explosion Venting, IBR approved for §1910.94(a)(2)(iii).

- NFPA 91-1961 Standard for the Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying (ANSI Z33.1-1961), IBR approved for §1910.94(a)(2)(iii), §1910.107(d)(1), and § 1910.261(f)(5).

- American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, Z9.2-1960 and ANSI Z33.1-1961, IBR approved for §1910.94(a)(4)(i).

- NFPA 656-1959 Standard for Dust Hazards in Spice Grinding Plants, IBR approved for §1910.263(k)(2)(i).

- ANSI Standards Z87.1-1968 and Z88.2-1957, IBR approved for § 1910.261(f)(5).

The following references apply to combustible dust hazards and industries.

- NFPA 33, Standard for Spray Application Using Flammable or Combustible Materials.
- NFPA 61, Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities.
- NFPA 68, Standard on Explosion Protection by Deflagration Venting.
- NFPA 69, Standard on Explosion Prevention Systems.
- NFPA 70, National Electrical Code.
- NFPA 77, Recommended Practice on Static Electricity.
- NFPA 85, Boiler and Combustion Systems Hazards Code.
- NFPA 86, Standard for Ovens and Furnaces.
- NFPA 91, Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids.
- NFPA 120, Standard for Fire Prevention and Control in Coal Mines.
- NFPA 484, Standard for Combustible Metals.
- NFPA 499, Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas.
- NFPA 505, Fire Safety Standard for Powered Industrial Trucks.
- NFPA 652, Standard on the Fundamentals of Combustible Dust.
- NFPA 654, Standard for the Prevention of Fires and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids.
- NFPA 655, Standard on Prevention of Sulfur Fires and Explosions.
- NFPA 664, Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities.
- NFPA 850, Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations.
- NFPA 2113, Standard on Selection, Care, Use and Maintenance of Flame- Resistant Garments for Protection of Industrial Personnel Against Flash Fire.
- ASTM E1226-12a, Standard Test Method for Explosibility of Dust Clouds.
- ASTM E1515, Standard Test Method for Minimum Explosible Concentration of Combustible Dusts.
- FM Global, Datasheet No. 5-1, Electrical Equipment in Hazardous (Classified) Locations.
- FM Global, Datasheet No. 5-8, Static Electricity.
- FM Global, Datasheet No. 6-9, Industrial Ovens and Dryers.
- FM Global, Datasheet No. 6-17, Rotary Kilns and Dryers.
- FM Global, Datasheet No. 7-04, Paper Machines and Pulp Dryers.
- FM Global, Datasheet No. 7-10, Wood Processing and Woodworking Facilities.
- FM Global, Datasheet No. 7-17, Explosion Protection Systems.
- FM Global, Datasheet No. 7-27, Spray Application of Ignitable and Combustible Materials.

- FM Global, Datasheet No. 7-36, Pharmaceutical Operations.
- FM Global, Data Sheet No. 7-73, Dust Collectors and Collection Systems.
- FM Global, Data Sheet No. 7-76, Prevention and Mitigation of Combustible Dust Explosion and Fire.
- FM Global, Datasheet No. 7-78, Industrial Exhaust Systems.
- FM Global, Datasheet No. 7-85, Metals and Alloys.
- National Materials Advisory Board (NMAB) 353-3-80, Classification of Combustible Dusts in Accordance with the National Electrical Code.
- ANSI/AMCA 99-16, "Standards Handbook."
- Center for Chemical Process Safety, Guidelines for Safe Handling of Powders and Bulk Solids, AIChE, 2010.

IV. Cancellations. None.

V. Action Information.

A. Responsible Office. UOSH.

B. Action Office. UOSH Compliance and Consultation and Education Services.

VI. Application.

UOSH compliance personnel should follow the guidance in this LEP when conducting inspections of facilities selected in Appendix B.

VII. Background.

OSHA introduced the initial Combustible Dust NEP on October 18, 2007, following a number of combustible dust incidents that resulted in numerous deaths and many serious injuries. The details of some of these incidents can be found in a report published by the U.S. Chemical Safety and Hazard Investigation Board (CSB). However, as a result of a catastrophic incident involving a combustible dust explosion at a sugar refinery, OSHA reissued its NEP on March 11, 2008, to increase its enforcement activities in specific industry groups that experienced either frequent combustible dust incidents or had the potential for combustible dust incidents with catastrophic consequences. Based on the lessons learned from its inspection experience and the hazards found under the NEP, OSHA revised and reissued the 2008 NEP. The purpose of this revised NEP was to continue to inspect facilities that generate or handle combustible dusts that are likely to cause fire, flash fire, deflagration, and/or explosion hazards. In fiscal years 2013 to 2017, OSHA conducted 2,553 combustible dust inspections – 910 programmed inspections and 1,253 un-programmed inspections.

During this period, the agency found 3,389 combustible dust violations – 1,022 from programmed inspections and 2,367 from un-programmed inspections. During this period, the

top five industries with combustible dust hazards were farm suppliers, institutional furniture manufacturers, metal window and door manufacturers, sheet metal work manufacturers, and re-upholstery and furniture repairing operations. Also during this period, animal food manufacturing, sawmills, wood manufacturing (e.g., cut-stock, re-sawing and planing), and agricultural processing facilities (e.g., grain and field beans) experienced the highest numbers of combustible dust-related fatalities and catastrophes.

In addition, the Combustible Dust Safety Science's Combustible Dust Incident Reports from 2016 to 2018 state that the majority of combustible dust hazards resulting in fires and explosions involved combustible dust generated during the manufacturing and processing of agricultural, food, wood, and metal products. In 2018, wood and food products made up an average of 70 percent of the materials involved in combustible dust fires and explosions. According to the incident reports, the majority of the industries involved in combustible dust hazards are wood processing; agricultural and food production; and lumber production.

Combustible dusts are often either organic or metal dusts that are ground into very small particles, fibers, fines, chips, chunks, flakes, or a mixture of these. Types of dusts include, but are not limited to:

- metal dust, such as aluminum, magnesium, and some forms of iron dust;
- wood dust;
- coal and other carbon dusts, including carbon black;
- plastic dusts, phenolic resins, toner, and additives;
- rubber dust;
- biosolids;
- organic dusts such as sugar, flour, paper, rubber, soap, and dried blood;
- human food dust;
- animal food dust; and
- dusts from certain textiles.

Some industries that generate or handle combustible dusts include:

- wood products, including lumber;
- agriculture;
- human food products;
- animal food products;
- chemicals;
- rubber;
- textiles;
- forest and furniture products;
- metal processing;
- tire and rubber manufacturing;

- paper products;
- 3-D printing;
- Pharmaceuticals;
- wastewater treatment;
- recycling operations (metal, paper, and plastic); and
- coal dust in coal handling and processing facilities.

Additional examples of combustible dusts can be found at: https://www.osha.gov/Publications/combustibledustposter.pdf and in the OSHA Technical Manual chapter on combustible dusts.

Dust fire, flash fire, deflagration, and explosion hazards in the industries noted here and in Section I, *Purpose*, as well as in other industries, are covered by several OSHA standards, incorporated by UOSH, UOSH rules and, where those standards and/or rules do not apply, the general duty clause. These hazards exist in a wide range of situations, and can involve process equipment, dust collection systems, electrical equipment, buildings, and portions of buildings. Combustible dust incidents range from localized fires to explosions that propagate through large structures, often following a pattern of "primary" and "secondary" explosions. Primary dust explosions most often occur in process equipment, but can also occur in enclosed rooms and structures. Secondary dust explosions and flash fires follow a primary (initiating) event or explosion that suspends dust into the air, often by dispersing accumulated dust deposits on equipment and overhead structures and support steel. Initiating events are often, but not always, primary combustible dust events. Inspections should consider the possibility of both primary and secondary explosions, fires, and flash fires.

VIII. Definitions.

The following is a partial listing of definitions based on NFPA standards that relate to combustible dust.

A. *Class II locations.* Locations that are hazardous because of the presence of combustible dust. The governing definition of Class II locations is in 29 CFR § 1910.399 (definitions for Subpart S-Electrical).

B. *Combustible dust.* A finely divided combustible particulate solid that presents a flash-fire hazard or explosion hazard when suspended in air or the process- specific oxidizing medium over a range of concentrations.

C. *Combustible Particulate Solid*. Any solid material composed of distinct particles or pieces, regardless of size, shape, or chemical composition that, when processed, stored, or handled in the facility, has the potential to produce a combustible dust.

D. *Deflagration*. Propagation of a combustion zone at a speed less than the speed of sound in the unreacted medium.

E. *Deflagration Isolation.* A method of employing equipment, such as flame arresters, flame front diverters, spark detection, spark extinguishing equipment, and rotary valves, and procedures that interrupt the propagation of a deflagration flame front past a predetermined point.

F. *Deflagration Suppression*. The technique of detecting and arresting combustion in a confined space while the combustion is still in its incipient stage, thus preventing the development of pressures that could result in an explosion.

G. *Detachment.* Location in a separate building or an outside area removed from other structures to be protected by a distance.

H. *Detonation.* Propagation of a combustion zone at or above the speed of sound in the unreacted medium.

I. *Dust Collector / System.* A combination of equipment and associated piping/ductwork/instrumentation designed to capture, contain, and transport fugitive dust to an air-material separator to remove the dust from the process equipment or surrounding area.

J. *Dust Explosion Hazard Area.* A room or building volume where an unvented deflagration of the entrainable dust mass can result in a pressure exceeding the strength of the weakest structural element not intended to fail.

K. *Dust Flash-Fire Hazard Area.* An area where combustible dust accumulation on exposed or concealed surfaces, external to equipment or containers, can result in personnel injury from thermal dose during a dust deflagration, as well as any areas where a dust cloud of a hazardous concentration exists.

L. *Dust Hazards Analysis (DHA):* A systematic review to identify and evaluate the potential fire, flash fire, or explosion hazards associated with the presence of one or more combustible particulate solids in a process or facility.

M. *Explosion.* The bursting or rupture of an enclosure or a container due to the development of internal pressure from deflagration.

N. *Flash Fire.* A fire that spreads by means of a flame front rapidly through a diffuse fuel, such as dust, gas, or the vapors of an ignitable liquid, without the production of damaging pressure.

O. *Minimum Explosible Concentration (MEC)*. The minimum concentration of combustible dust suspended in air, measured in mass per unit volume that will support a deflagration. Note that in some references, including some tables in NFPA standards, MEC may be referred to as LFL (Lower Flammable Limit) or LEL (Lower Explosible Limit).

P. *Hybrid mixtures*. An explosible heterogeneous mixture, comprising of gas with suspended solid or liquid particulates, in which the total flammable gas concentration is ≥10 percent

of the lower flammable limit (LFL) and the total suspended particulate concentration is ≥10 percent of the minimum explosible concentration (MEC).

Q. *Dust deflagration index, Kst*. The maximum rate of pressure rise generated when dust is tested in a confined enclosure and normalized for vessel volume. It provides an indication of the severity of a dust explosion.

R. *Minimum Ignition Energy (MIE).* The lowest capacitive spark energy capable of igniting the most ignition-sensitive concentration of a flammable vapor-air mixture or a combustible dust-air mixture as determined by a standard test procedure.

S. *Minimum Ignition Temperature (MIT)*. The lowest surface temperature capable of igniting a powder or dust dispersed in the form of a dust cloud or as a layer on a hot surface.

T. *Pressure Ratio (PR).* The ratio of the maximum pressure due to combustion (minus ignitor pressure) to the pressure at ignition.

U. *Non-separated*. Dust accumulations are considered non-separated unless segregation, separation, or detachment is used to limit the hazard area.

V. *Segregation*. The establishment of a physical barrier between the dust hazard area and an area to be protected.

W. *Separation*. The inclusion of minimum separation distance between the combustible particulate solid process and other operations that are in the same [compartment/subdivision of an enclosure].

IX. Program Procedures.

A. Inspection Scheduling.

Inspections conducted under this LEP will focus on general industry facilities where workers may be exposed to combustible dust hazards.

1. Using the most recently available Utah Department of Workforce Services Industry Data, UOSH will prepare a list based on a random number table (RNT) (see CPL 02-00-025) of establishments in the North American Industrial Classification System (NAICS) codes in Appendix B of this instruction, which lists industries with potential combustible dust hazards. Each establishment on the resulting list will be assigned a sequential number, starting at the top of the list with number one.

2. Based on its familiarity with local industries, UOSH may make appropriate additions and deletions to its list. See OSHA Instruction CPL 02-00-025 (CPL 2.25I)—Scheduling Systems for Programmed Inspections.

- Facilities with a known pattern of combustible dust hazards (with NAICS codes other than the ones listed in Appendix B) may be added, in alphabetical order, to the bottom of the list, and the reason for the addition should be documented.

- Facilities not likely to have combustible dust hazards may be deleted from the master list and the reason for the removal should be documented.

- Establishments known to be out of business should be removed from the list and the reason for removal should be documented.

UOSH should delete any establishment which:

a. has been inspected for combustible dust hazards within the previous five fiscal years, based on the opening conference date;

b. has been inspected for combustible dust hazards and the inspection did not result in the issuance of citations for combustible dust hazards;

c. had been inspected for combustible dust hazards, received citations for those hazards and a follow-up inspection revealed effective abatement of those hazards cited; or

d. has been inspected for combustible dust hazards and UOSH received abatement verification that the dust hazards have been effectively abated. An establishment with a pending contest of a citation related to combustible dust hazards will not be deleted, but the inspection will be deferred during the contest.

3. Voluntary Programs.

- Active Voluntary Protection Program (VPP) or Safety and Health Achievement Recognition Program (SHARP) participants are not subject to programmed inspections and should be removed from the list for the duration of approved participation in the VPP and SHARP. The site will remain off the list until the approved VPP or SHARP participant has withdrawn or been terminated from its respective program.

- If an On-Site Consultation visit is "in progress" at an establishment, it will take priority over UOSH programmed inspections, except for imminent danger, fatality/catastrophe, complaint, or other critical inspections. An On-Site Consultation visit will be considered "in progress" in relation to the working conditions, hazards, or situations covered by the visit from the beginning of the opening conference through the end of the correction due dates and any extensions thereof (29 CFR 1908.7(b)(1) & (b)(2)).

- CSHOs should follow procedures outlined in Chapter 2, Program Planning, of the UOSH FOM for further guidance if an On-Site Consultation visit is in progress, or if the establishment is a participant in the VPP or SHARP.

4. If additions and deletions have been made, each establishment on the resulting establishment list will be assigned a sequential number, starting at the top of the

list with number one. A random number table (RNT) as described in CPL 02-00-025 (CPL 2.25I) should then be applied.

5. UOSH will ensure that they schedule and conduct enforcement activities following the guidelines set forth in CPL 02-00-051, Enforcement Exemptions and Limitations under the Appropriations Act.

6. The establishment list generated under this LEP must be maintained in the UOSH Office for a period of three years.

B. Scheduling and Resource Allocation.

1. If UOSH receives a formal complaint or referral about a combustible dust hazard at a facility generating or handling combustible dust, it shall investigate the complaint or referral item(s) in accordance with Chapter 9 of the UOSH FOM. An inspection under this LEP may be conducted at the UOSH Director's or designee's discretion.

2. If UOSH receives a non-formal complaint about a combustible dust hazard involving a facility generating or handling combustible dust, it should investigate the complaint based on the criteria contained in Chapter 9 of the UOSH FOM. An inspection under this LEP may be conducted at the UOSH Director's or designee's discretion.

3. When determining whether to inspect under this LEP based on formal or non-formal complaints, the UOSH Director or designee should evaluate the types of dusts likely to be present, information on published explosibility parameter values (e.g., Kst, PR, MIE, others), potential for employee exposure, and incident history at the facility and/or in the facility's industry, as classified by NAICS.

4. When responding to incidents and catastrophes at facilities generating or handling combustible dust, CSHOs should follow the guidelines contained in Chapter 11 of the UOSH FOM. If a fatality or catastrophe investigation arises at a facility due to a combustible dust fire, flash fire, deflagration, or explosion, an inspection should be conducted under this LEP.

C. Inspection Resources.

1. Only CSHOs trained and knowledgeable in recognizing hazards associated with combustible dust should be assigned to conduct inspections under this LEP. The UOSH Director will ensure that an appropriate number of CSHOs are trained in the contents of Course #3320, Combustible Dust Hazards and Controls, offered by either the OSHA Training Institute (OTI) or the UOSH Compliance Field Operations Manager (Field Operations Manager), and will ensure such CSHOs are available for inspections under this LEP.

2. Only consultants trained and knowledgeable in recognizing combustible dust

hazards shall conduct consultation visits at facilities subject to this LEP. The UOSH Consultation and Education Services Program Manager (Consultation Manager) will ensure consultants are trained in the contents of Course #3320, Combustible Dust Hazards and Controls.

The UOSH Director has the discretion to approve alternative training courses. The Consultation Manager will also ensure that consultants have access to resources listed in paragraph 5, below, and apply precautions as specified in paragraph 6, below, and elsewhere in this directive.

3. The Field Operations Manager, in coordination with the UOSH Director, should decide as soon as practicable whether or not experts from outside UOSH (such as expert witnesses) will be needed to support a combustible dust case. In such cases, experts should be involved at the earliest possible date.

4. The OSHA Health Response Team (HRT), in the Salt Lake Technical Center (SLTC), has experience in combustible dust inspections and may be available to assist on technically complex cases. Requests for such assistance requires prior approval from the UOSH Director or designee.

5. The SLTC provides technical support for inspections. If appropriate, the UOSH Director should decide as soon as practicable whether or not SLTC assistance is required to support a combustible dust case. If required, the SLTC should be involved at the earliest possible date.

6. UOSH must ensure CSHOs have access to the NFPA website (registration required for online viewing) and to the latest editions of the following documents:

    a. OSHA Technical Manual chapter on combustible dust.

    b. NFPA 652, Standard on the Fundamentals of Combustible Dust.

    c. NFPA 654, Standard for the Prevention of Fires and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids.

    d. NFPA 484, Standard for Combustible Metals, Metal Powders, and Metal Dusts.

    e. NFPA 664, Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities.

    f. NFPA 61, Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities.

    g. NFPA 68, Standard on Explosion Protection by Deflagration Venting.

    h. NFPA 69, Standard on Explosion Prevention Systems.

i. NFPA 85, Boiler and Combustion Systems Hazards Code.

j. NFPA 499, Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas.

k. NFPA 655, Standard on Prevention of Sulfur Fires and Explosions.

l. NFPA 33, Standard for Spray Application Using Flammable or Combustible Materials.

m. NFPA 77, Recommended Practice on Static Electricity.

n. NFPA 91, Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids (Note: this has been updated to cover all particulate solids—older versions only covered non- combustible particulates).

o. FM Global, Datasheet No. 5-8, Static Electricity.

p. FM Global, Datasheet No. 6-17, Rotary Kilns and Dryers.

q. FM Global, Datasheet No. 7-10, Wood Processing and Woodworking Facilities.

r. FM Global, Datasheet No. 7-17, Explosion Protection Systems.

s. FM Global, Data Sheet No. 7-73, Dust Collectors and Collection Systems.

t. FM Global, Data Sheet No. 7-76, Prevention and Mitigation of Combustible Dust Explosions and Fire.

u. FM Global, Datasheet No. 7-85, Metals and Alloys.

v. ANSI/AMCA 99-16, "Standards Handbook."

w. Center for Chemical Process Safety, Guidelines for Safe Handling of Powders and Bulk Solids, AIChE, 2010.

The CSHOs must also have access to the following industry standards incorporated by reference in OSHA standards.

a. NFPA 62-1967 Standard for the Prevention of Dust Explosions in the Production, Packaging, and Handling of Pulverized Sugar and Cocoa, IBR approved for §1910.263(k)(2)(i).

b. NFPA 68-1954 Guide for Explosion Venting, IBR approved for §1910.94(a)(2)(iii).

c. NFPA 91-1961 Standard for the Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying (ANSI Z33.1-1961), IBR approved for §1910.94(a)(2)(ii) §1910.107(d)(1), and §1910. 261(f)(5).

d. NFPA 656-1959 Standard for Dust Hazards in Spice Grinding Plants, IBR approved for §1910.263(k)(2)(i).

e. ANSI Standards Z87.1-1968 and Z88.2-1957, IBR approved for § 1910.261(f)(5).

7. CSHO Safety and Health Protections.

CSHOs should take appropriate precautionary measures for the particular hazards presented in facilities with combustible dust.

a. Personal Protective Equipment (PPE): In addition to the normally required personal protective equipment, CSHOs should wear non- spark-producing or flame-resistant (FR) clothing complying with NFPA 2112 during the inspections under this LEP. NFPA 2113 should be consulted for selection, care, and maintenance of FR clothing.

FR clothing should meet the design and testing requirements of NFPA 2112 and should include the label: "THIS GARMENT MEETS THE REQUIREMENTS OF NFPA 2112, STANDARD ON FLAME-RESISTANT GARMENTS FOR PROTECTION OF INDUSTRIAL PERSONNEL AGAINST FLASH FIRE. NFPA 2113 REQUIRES UPPER AND LOWER BODY COVERAGE."

For inspections involving combustible metal or other low-MIE dusts, and where employers have installed static dissipative flooring to reduce ignition hazards, static dissipative footwear must be worn, or other means used to ensure that CSHOs are appropriately grounded.

b. Standard cameras for photographs and videos should be used only when CSHOs are located sufficiently away from any dust clouds in Class II and Class I locations. However, if the violative conditions involve hybrid mixtures, the cameras must be suitable for use in Class I locations and no dust clouds can be present. Use of standard cameras in Class I or Class II, Division 2 locations may also be acceptable if appropriate precautions are taken, such as by following the employer's protective hot work permit process with continuous monitoring for flammable vapors and visual monitoring for suspended dust.

c. CSHOs should use safe practices when collecting samples. A dust cloud should not be present or generated while collecting a sample and care should always be taken to avoid potential ignition sources, including (for certain dusts) accumulated static electrical charges. See the OSHA Technical Manual chapter on combustible dust for detailed information on safe dust sampling procedures (including sampling of low MIE dusts, toxic dusts, metal dusts, hybrid dusts, elevated locations, etc).
d. Pictures of dust layer thicknesses, and quantities/extent of dust accumulations, are also valuable and should be used to document CSHO findings. Obtaining photographs of elevated or otherwise inaccessible areas may be possible by using a camera mounted on an extension pole with remote or timed exposure control.

D. Inspection and Citation Procedures.

During the opening conference and after a preliminary walk-around of the facility, if the CSHO determines that the employer's operation does not have combustible dust explosion, deflagration, or other fire hazards, the CSHO may terminate the inspection after consulting with the UOSH Director or designee.

If the facility is covered under the grain handling standard (29 CFR1910.272), CSHOs should follow the guidance provided in OSHA Instruction, CPL 02-01- 004, Inspection of Grain Handling Facilities, 29 CFR 1910.272, November 8, 1996.

CSHOs should review the following to determine whether fire, flash fire, deflagration, or explosion hazards exist:

1. Plant History of Fires and Explosions: Determine whether the plant has a history of fires, flash fires, deflagrations (including deflagrations propagating between process vessels, inside buildings), and explosions of vessels. Employee interviews, OSHA logs, insurance claims, and local fire department records may be helpful in establishing facility fire history. The condition of equipment can also be highly indicative of prior fires and explosion. Be alert to discoloration, bulging, repairs, and missing or damaged equipment and appurtenances.

2. Safety Data Sheets (SDS): The SDS may indicate that a particular dust is combustible and may cause fires, flash fires, deflagrations, or explosions. However, SDSs should be used for informational purposes only to address dust combustibility. Testing/sampling must be performed to determine the explosion and combustibility parameters of the dust samples. Details of these tests are found in the OSHA Technical Manual chapter on combustible dust.

3. Electrical area classification drawings/documents: Electrical area classification drawings/documents for the facility required to be developed in accordance with 29 CFR 1910.307(b) shall be reviewed. The CSHO must identify areas delineated

as Class II, Division 1 or Division 2, and ensure electrical equipment is approved for the hazardous location.

4. Dust Hazard Analysis (DHA): The systematic hazard analysis performed by the employer, to identify and evaluate the potential fire, flash fire, or explosion hazards associated with the presence of combustible dust in a process or facility, should be reviewed toward the end of the inspection when considering a citation or Notice in Lieu of Citation letter, and should not be used in determining the scope of the inspection.

   CSHOs should observe all areas of a facility for potentially hazardous accumulations of combustible dust. Likely areas of dust accumulations are:

   - horizontal structural members
   - conduit and pipe racks
   - cable trays
   - floors
   - areas above suspended ceilings
   - on and around equipment (e.g., dust collectors and ductwork), particularly on elevated horizontal surfaces

   For guidance on evaluating dust deposits, refer to the OSHA Regional Administrators Memorandum Evaluating Hazardous Levels of Accumulation Depth for Combustible Dusts, April 21, 2015.

5. CSHOs should observe and verify whether:

   a. Dry dust collectors (see NFPA 484, *Standard for Combustible Metals*, for information on metal dust collectors) and other dust handling equipment located inside the buildings are provided with:

      - explosion prevention/protection systems to control the risk of rupture of the collectors, such as, but not limited to:
        - ignition source detection and suppression systems, where appropriate;
        - explosion suppression systems, which detect sudden pressure rise and inject chemical suppressants to interrupt the combustion process;
        - explosion vents ducted to safe locations, outside the building, away from platforms, means of egress, or other potentially occupied areas; and
        - "flameless" venting systems (i.e., flame arresting and particulate retention systems) used for inside venting (see NFPA 68 for information).

- deflagration propagation prevention devices, such as, but not limited to:
    - active isolation devices, such as high-speed isolation valves, or chemical injection flame-front quenching systems.
    - passive isolation devices, such as flow-actuated flap valves, diverters, or appropriately designed chokes (e.g., rotary valves).

b. Dust systems returning clean air to buildings are provided with proper protections against fire, deflagration, and toxic material propagation into those buildings, such as, but not limited to:

- spark detection and extinguishing systems for fire exposure; and high-speed abort gates in duct or pipe upstream of abort gates that is activated by pressure or spark detection systems to prevent sparks, glowing embers, or burning materials from passing beyond the abort gate. The abort gate shall be installed so that it diverts airflow to a restricted area to safely discharge combustion gases, flames, burning solids, or process gases or fumes.

- appropriate devices for isolating against deflagration/explosions (i.e., flame front and pressure effects). See NFPA 69 for information on appropriate isolation devices.

c. Hazardous levels of combustible dust accumulations are present outside of equipment. See the supplemental informative materials in the OSHA Technical Manual chapter on combustible dust and the OSHA Regional Administrators Memorandum Evaluating Hazardous Levels of Accumulation Depth for Combustible Dusts, April 21, 2015, for guidance in determining hazardous levels of dust accumulations.

d. The number and size of horizontal surfaces (such as beams, ledges, screw conveyors and other elevated surfaces) are minimized and the surfaces are designed to prevent accumulation of dust.

e. Equipment producing, transporting, storage, and handling dust (such as mixers, mills, silos, ducts, dust collectors, and similar equipment) is designed and maintained to prevent dust leakage/escape and the formation of visible dust clouds in the work environment. See the OSHA Technical Manual combustible dust chapter for a summary of common concerns with many specific types of equipment. For additional information, refer to the Center for Chemical Process Safety (CCPS), *Guidelines for Safe Handling of Powders and Bulk Solids*, American Institute of Chemical Engineers (AIChE).

f. Material transport systems, such as horizontal conveyors, bucket elevators, and pneumatic conveying systems, are designed and maintained to prevent dust leakage/escape and the formation of visible dust clouds in the work environment. See the OSHA Technical Manual combustible dust chapter for a summary of common concerns with many specific types of equipment. For additional information, refer to CCPS, *Guidelines for Safe Handling of Powders and Bulk Solids*, AIChE.

g. Removal of accumulated dust layers may be accomplished by vacuum cleaning, sweeping, and water wash-down methods. However, compressed air, or other high-energy means, may be used to clean combustible dust accumulations for some dusts only if appropriate safeguards (e.g., rigorous ignition source control) have been implemented and the pressure is limited to less than 30 psi with effective chip guarding and personal protective equipment in accordance with 29 CFR 1910.242(b). Portable vacuum cleaners are permitted to be used to collect combustible particulate solids in unclassified (nonhazardous) areas if they meet the following requirements: 1) appropriate materials of construction, 2) hoses are conductive or static dissipative, 3) all conductive components, including wands and attachments are bonded and grounded, 4) any dust-laden air does not pass through the fan or blower, and electrical motors are not within the dust-laden air stream unless listed for Class II, Division 1, locations.

h. Electrical equipment, including lighting, is listed for use in the workplace based on the class, division, and group classification (i.e., Class II, Division 1 or Division 2) in accordance with 29 CFR 1910.307.

i. Powered industrial trucks (PITs) used in the areas generating or handling combustible dusts are approved for the locations.

j. Welding, cutting, grinding or any other hot work is not performed in areas where combustible dust is generated or handled. 29 CFR 1910.252(a)(2)(vi)(C) prohibits cutting and welding in in the presence of explosive atmospheres (including mixtures of dusts with air), or explosive atmospheres that may develop inside uncleaned or improperly prepared tanks or equipment which have previously contained such materials, or explosive atmospheres that may develop in areas with an accumulation of combustible dusts.

k. Ductwork from dust-generating, handling, and collecting systems to other areas of the plant is conductive, bonded, and grounded to dissipate static accumulation. Note that non-conductive gaskets and seals, and non-conductive sleeves under compression fittings between pneumatic conveyance ducting sections, require appropriate use of grounding clips and jumper cables to ensure sections are electrically isolated.

l. Appropriate maintenance of mechanical equipment is performed to prevent the generation of heat and sparks.

m. Magnetic separators and/or tramp metal separators are installed on process systems (such as those involving mills, grinders, pulverizers, and other size-reduction equipment), ahead of the equipment to be protected, to prevent foreign material from entering process streams and igniting fires, flash fires, and explosions.

n. Adequate transport (conveying) velocity is maintained in the ductwork to prevent combustible dust from accumulating in the ducts. The minimum required velocities can vary significantly based on dust characteristics.

o. Ducts are equipped with suitable inspection and cleanout ports/hatches (refer to NFPA 91-2015, *Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids*, for examples).

p. Ignition control programs are implemented to prevent the introduction of ignition sources including but not limited to the following:

- hot work;
- hot surfaces;
- bearings;
- self-heating materials;
- open flames;
- fuel-fired equipment;
- heated process equipment;
- heated air;
- frictional sparks;
- impact sparks;
- electrical equipment (including industrial trucks); and
- electrostatics or other similar sources in the dust handling equipment.

q. Housekeeping procedures are in place, are adequate, and are being followed.

r. Upon approval by the UOSH Director, consult HRT resources if assistance is required in evaluating combustible dust hazards and controls.

6. Collecting Samples.

When it is safe to do so, CSHOs should collect samples from each area in which there is reason to believe a combustible dust hazard may be present. For more detailed information on sampling techniques, particularly sampling hazardous dusts (i.e., low MIE, metal, toxic and hybrid mixtures), see the OSHA Technical Manual combustible dust chapter.

a. If sampling presents any safety concerns, refer to section IX.C.7, *CSHO Safety and Health Protections*, and the information and procedures in the OSHA Technical Manual combustible dust chapter for guidance on evaluating hazards and determining safe sampling methods and equipment.

b. Document dust accumulation hazards and collect separate samples from various locations within a particular area, including:

- Elevated surfaces (such as tops of pipes, ductwork and other overhead horizontal surfaces).
- Floors and equipment surfaces where fine dust has accumulated.

c. Document dust handling equipment (such as dust collector) hazards. CSHOs should collect samples from within process equipment only when it is safe to do so or when representative samples cannot be obtained through other means (e.g., dust bins, hopper dropout points). CSHOs should never open process equipment; this must only be done by appropriate facility personnel and then CSHOs may take the sample. CSHOs must not enter a confined space to obtain samples; use of appropriate scoops on extension poles is one method to safely retrieve samples from equipment.

- Equipment for collecting dust samples may include:
  - natural bristle hand brushes for collecting settled dust;
  - non-sparking, conductive dust pans (aluminum), for collecting settled dust;
  - non-spark producing sample containers;
  - non-spark producing funnel for filling sample containers; and
  - non-spark producing scoops (e.g., fabricated from aluminum, bronze, brass, or other non-sparking materials) for removing dust from dust collection or other equipment and for filling sample containers.

Note: The Directorate of Technical Support and Emergency Management (DTSEM) can supply many of these sampling materials to Consultation, including a combustible dust sampling kit, through the Cincinnati Technical Center (CTC) Agency Expendable Supplies Program (AESP). In addition, SLTC can provide UOSH Compliance and Consultation personnel bonding/grounding kits to be used for low-MIE dust sampling protocols as discussed in the OSHA Technical Manual combustible dust chapter.

Note: The CTC can only supply sampling kits and supplies to Consultation, not Compliance.

d. Samples must be collected in a 1-liter plastic bottle and from the same general area until the 1-liter plastic bottle is full, if possible.

e. CSHOs must affix an official sample identification seal (SAMPLE SEAL) to the container. To seal the bottle correctly, apply one end of the seal to the center of the lid, then run the seal to the edge of the lid and as far down the side of the bottle as it will reach.

f. CSHOs should document the description of the operation in block 18 of the OSHA 91A Form (OIS now has a bulk sampling sheet that is similar to the OSHA 91A; a blank form can be printed from OIS) and indicate the tests to be done on block 30 of the OSHA 91A. In addition:

- Document the dust deposits sampled with photography and sketches showing the extent and depth of the dust deposits.
- Document the operation (or lack) of dust collecting equipment and fans in the areas sampled.
- Document potential dispersal methods and ignition sources observed near where the samples are collected.

g. Upon approval from the UOSH Director to submit samples to SLTC, CSHOs should contact SLTC for instructions on sending samples and for any special shipping instructions. Normally, CSHOs will hand-deliver samples to SLTC.

h. When available, CSHOs should submit an SDS (or SDSs) which represent the submitted sample. This is particularly important for toxic materials [e.g., pharmaceuticals, materials with specific permissible exposure limits (PELs), threshold limit values (TLVs), or occupational exposure limits (OELs)].

7. CSHOs must never enter areas where combustible dust is suspended in the air. Additional precautions when collecting dust samples are documented in the OSHA Technical Manual combustible dust chapter and in section IX.C.7., *CSHO Safety and Health Protections*, of this directive.

8. SLTC Tests.

SLTC performs a series of tests to determine the explosibility and combustibility parameters of the dust samples submitted. Details of these tests are found on the OSHA Technical Manual combustible dust chapter. However, CSHOs should note that only Kst and/or Class II tests are required for EP inspection documentation purposes.

Note: The SLTC Kst test methodology, including sample preparation and ignitor

energy, differs from the industry standard, ASTM E1226 test methodology. These differences are specifically intended to ensure that OSHA test results are accurate in demonstrating combustible dust hazards. Employers should not rely on OSHA test results for the design or specification of combustible dust protective systems.

9. Case File Documentation.

CSHOs must gather information about the employer's process and how equipment is connected and how material flows (e.g., process flow diagrams, and piping and instrumentation diagrams) to understand where combustible dust hazards exist, as well as the measures taken by the employer to control the combustible dust hazards. The case should include any relevant NFPA standards, other industry standards, and other relevant sources, such as articles in trade journals. The following information should be gathered during the course of the inspection:

a. Photographs, diagrams, sketches and videos documenting combustible dust hazards, including the extent and depth of dust layers and sampling locations. Also, the location and condition of equipment associated with the dust hazards, especially if inadequately protected.

b. The dimensions of the room or area as well as the hazardous levels of dust accumulations (see Evaluating Hazardous Levels of Accumulation Depth for Combustible Dusts, April 21, 2015 for guidance). A diagram with measurements of the room, including dimensions of dust areas and accumulations, must be included in the case file. If separation or segregation is used or claimed by the employer, document the distances and suitability of that separation or segregation methodology.

c. Engineering controls (e.g. explosion protection, explosion prevention, and ignition control measures), such as:

- separation or segregation of dust-generating processes
- ignition source control
- deflagration suppression systems or explosion suppression systems
- pressure containment (i.e., for use on size reduction equipment and for confined large vessels under partial volume deflagration conditions)
- inerting (limiting oxygen content control) systems
- deflagration/explosion venting
- active or passive deflagration propagation protection (isolation and diversion) devices
- fire detection and suppression devices
- fire detection and abort devices

See NFPA 68 and NFPA 69 and other relevant dust-specific NFPA documents for information.

d. The design information on the dust collection systems and other equipment of interest, including manufacturer's name, make, model, and serial numbers, date of manufacture, and contact information (normally located on the side of the equipment). Also document the date of installation and obtain the installation and operation manuals for the equipment. See the OSHA Technical Manual combustible dust chapter for guidance on specific design information needed.

e. Size (volume) of dust collectors (Note: Dust collectors are also referred to as "air-material separators" in NFPA 652 and NFPA 654), and the design maximum air flow through the system. Obtain both "dirty" and "clean" side volumes of the collectors, if available.

f. Warning signs or alerts on the equipment, referencing combustible dust.

g. External ignition sources, including:

- Any sources of heat and ignition in the area (such as welding/hot work, powered industrial truck/forklift traffic, fired equipment, hot surfaces, and other ignition sources).
- Information on whether the electrical equipment in the area is designed for use in a hazardous (classified) location. Electrical boxes/enclosures/equipment located in a Class II area that are not approved or rated for that location indicate a likely 1910.307(c) violation. Most enclosures will have visible rating information (such as Class II, Division 1 or 2, or Zone 20, 21, or 22 per NFPA 70, the National Electric Code, Articles 500, 502, and 506, as appropriate, or international equivalent). Use caution and rely on trained employer personnel if enclosures have to be opened to determine their ratings, and then only if the associated wiring is de-energized.

h. Equipment with internal ignition sources, including:

- Bearings
- Mechanical equipment subject to mechanical impact (e.g., rotors, blades, hammers, buckets, etc.)
- Tramp metal in feed or from upstream equipment
- Static discharge potential due to lack of connectivity/bonding/grounding (e.g., dust collector bag collars, cages, clamps, connecting ductwork, etc.)
- Electrical equipment and instrumentation internal to equipment not suitable for the service
- Electrical classification drawings or documents describing areas determined by the employer to be hazardous (classified) for combustible dusts (i.e., Class II Division 1 or 2 areas).

X. Citations.

UOSH may only cite for violations of OSHA standards and regulations incorporated by reference under Utah Administrative Code R614-1-4; UOSH Rules; and section 34A-6-201(1)(a) of the Utah OSH Act (the General Duty Clause). NFPA and other industry standards, unless expressly incorporated by reference in 29 CFR 1910.6, shall not be cited as enforceable requirements. NFPA and other industry standards not incorporated by reference may be used as evidence in support of general duty clause violations, as discussed below.

A. Citation Guidance.

1. Housekeeping violations (in areas other than storage areas). If the facility being inspected under this LEP is not a grain handling facility and surface dust accumulations **(i.e., dust accumulations outside the dust collection system or other containers, such as mixers**) create a combustible dust hazard, then housekeeping violations should be cited under 29 CFR 1910.22 (housekeeping). The standard provides in pertinent part: "(a) *Housekeeping*. (1) All places of employment, passageways … and service rooms shall be kept clean… (2) The floor of every workroom shall be maintained in a clean…condition." Small amounts of dust accumulations in isolated spots on the floor or in other areas would not normally be classified as a violation of the housekeeping requirement under this LEP. Citations for violations of this standard should therefore not be issued without evidence of a combustible dust hazard, as described below. See Evaluating Hazardous Levels of Accumulation Depth for Combustible Dusts, April 21, 2015, for guidance.

    - In determining if an explosion, deflagration, flash fire, or other fire hazard from dust accumulations exists at a facility, see Evaluating Hazardous Levels of Accumulation Depth for Combustible Dusts, April 21, 2015, for evaluation guidance and Appendix C for sample citation language. See the OSHA Technical Manual combustible dust chapter for guidance on the evaluation of housekeeping hazards.

    - To substantiate housekeeping violations, take representative measurements. Thickness measurements shall be taken at several locations within the sampling area. The area of the room and areas of dust accumulations, together with dust thicknesses, shall also be documented.

    - Citations for violations of 29 CFR 1910.22(a)(1) should be issued when the depth and extent of dust accumulations in places of employment (except floors of workrooms and storage areas), passageways, and service rooms can present explosion, deflagration, or other fire hazards. 29 CFR 1910.22(a)(1) would be cited for excess combustible dust accumulation on top of equipment, structural members, ductwork, etc.

    - Issue citations for 29 CFR 1910.22(a)(2) when the extent and depth of

dust accumulations on the floors of workrooms can present fire, flash fire, deflagration, and explosion hazards.

2. This LEP should not be construed to affect the application of 29 CFR 1910.22 or other housekeeping standards to uncleanliness hazards at workplaces unrelated to combustible dust hazards. Housekeeping violations in storage areas. Cite under 29 CFR1910.176(c) for housekeeping violations in storage areas. The standard provides in pertinent part: "(c) *Housekeeping.* Storage areas shall be kept free from accumulation of materials that constitute hazards from …fire, explosion…" The criteria for determining a hazard outlined in paragraph 1 above, with respect to citations for 29 CFR 1910.22(a) violations under this LEP, also apply in determining 29 CFR 1910.176(c) violations. To support a violation of this standard, the CSHO should gather evidence as to whether a reasonable person would recognize a combustible dust hazard. Also see Appendix A and Section III (references). The CSHO must also document feasible abatement methods. See e.g., applicable NFPA combustible dust standards.

3. Section 34A-6-201(1)(a) (General Duty Clause) violations. A citation under section 34A-6-201(1)(a) of the Utah OSH Act (the General Duty Clause) may be issued for fire, flash fire, deflagration, and explosion hazards that may be caused by combustible dust *within a dust collection system or other equipment*, such as, but not limited to, mixers, dryers, silos (material storage), bucket elevators (material transport), or mills. See the OSHA Technical Manual combustible dust chapter for other types of equipment (bucket elevators, etc.) where explosion hazards have been identified. Also refer to CCPS, Guidelines for Safe Handling of Powders and Bulk Solids, AIChE for more information.

   The NFPA standards, which represent the opinions of experts familiar with combustible dust hazards, are useful in providing evidence of industry recognition of the hazard and potential feasible means of abatement. See, for example, NFPA 654, *Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solid.* Where appropriate, and at the UOSH Director's discretion, the UOSH Office should consult with experts familiar with dust collection equipment.

   CSHOs should also search for articles dealing with combustible dust hazards in publications addressing the employer's industry.

   CSHOs should also review the employer's safety manuals and/or procedures and SDSs, equipment warning labels, operating manuals, installation instructions, maintenance procedures, other documents, incidents and any employee complaints to determine whether there is employer recognition of the combustible dust hazard. However, if such references or employer documents are unavailable, CSHOs may rely upon the NFPA standards for evidence of industry recognition of the hazard.
   For evidence of potential feasible means of abatement, CSHOs should consult relevant NFPA standards and note applicable provisions in the listing of feasible

abatement methods.

Proposed General Duty Clause citations should identify the particular hazardous condition, process or practice that presents a danger of serious harm or death to employees. General Duty Clause citations shall not be issued where a hazard has been described as the failure to use a particular abatement method. See Appendix C for a sample citation.

General Duty Clause citations may be issued for deflagration and explosion hazards if SLTC finds Kst values of the submitted dust sample to be greater than zero. General Duty Clause citations can only be issued where all elements of a Utah Code Ann. § 34A-6-201(1)(a) violation are documented.

Note: If all the elements of a Utah Code Ann. § 34A-6-201(1)(a) violation cannot be established for hazards noted during an inspection, a Notice in Lieu of Citation should be considered. Furthermore, in cases where determined Kst values, based on dust samples from the inspection, are less than 1.5 and PR are less than 2.0, a Notice in Lieu of Citation may be issued at the UOSH Director's discretion. See the OSHA Technical Manual combustible dust chapter for more on Kst and pressure ratios.

The following are examples of workplace conditions for which a General Duty Clause citation (See Appendix C for sample citations) may be issued:

- Problems related to dust collectors, e.g., dust collection equipment located inside the building (however, there are some exceptions) and dust collectors returning air back inside the building.
- Ductwork-related problems, e.g., the ductwork not being grounded and ductwork not constructed of metal.
- Improperly designed deflagration venting (venting to areas where employees are likely to be exposed to explosion/deflagration hazards).
- Processing and material handling equipment, such as, mixers, blenders, pulverizers, mills, dryers, ovens, filters, dust collectors, pneumatic conveyors, and screw conveyors, are not protected by deflagration suppression systems.
- Blowers, collection systems, and exhaust systems used at sawmills that are not designed, constructed, or maintained properly. For information refer to American National Standards Z33.1 -1961 (For the Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying) and Z12.2 (1962) (R1969) (Code for the Prevention of Dust Explosion in Woodworking and Wood Flour Manufacturing Plants).

4. Grain Handling Standard violations. For violations at grain handling facilities (e.g., flour mills), citations should be issued under 29 CFR 1910.272. (See OSHA Instruction CPL 02-01-004, Inspection of Grain Handling Facilities, and 29 CFR 1910.272).

5. Ventilation Standard violations. If the facility's operations are covered by paragraph (a) of 29 CFR1910.94, *Ventilation,* then violations of this standard should be cited. Paragraph (a) of the standard covers abrasive blasting, including fire and explosion hazards.

   The standard at 29 CFR 1910.94 (a)(2)(ii) provides;
   (iii) Organic abrasives which are combustible shall be used only in automatic systems. Where flammable or explosive dust mixtures may be present, the construction of the equipment, including the exhaust system and all electric wiring, shall conform to the requirements of American National Standard Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, Z33.1–1961 (NFPA 91–1961), which is incorporated by reference as specified in § 1910.6, and subpart S of this part.

   The blast nozzle shall be bonded and grounded to prevent the buildup of static charges. Where flammable or explosive dust mixtures may be present, the abrasive blasting enclosure, the ducts, and the dust collector shall be constructed with loose panels or explosion venting areas, located on sides away from any occupied area, to provide for pressure relief in case of explosion, following the principles set forth in the National Fire Protection Association Guide for Explosion Venting, NFPA 68–1954, which is incorporated by reference as specified in § 1910.6.

   Because the NFPA standards noted above are incorporated by reference in the OSHA standards, they are binding requirements and must be specifically referenced in the citation.

6. Housekeeping violations at coal-handling operations covered under 29 CFR 1910.269. If violations of 29 CFR 1910.269(v)(11)(xii) (sources of ignition not eliminated or controlled where coal-handling operations may produce a combustible atmosphere from fuel sources) are identified during an inspection of a coal-fired power plant, then cite this provision, not 29 CFR 1910.22 or Utah Code Ann. § 34A-6-201(1)(a). CSHOs still need to document hazardous accumulations of dust to sustain these citations.

7. Personal protective equipment (PPE) violations. Citations under 29 CFR 1910.132(a) (the general requirement to provide and ensure the use of protective equipment, including protective clothing) may be issued where employee exposures to potential burn injuries are documented. For example, if employees are not wearing protective clothing, such as flame- resistant (FR) clothing, in areas of the plant (e.g., bagging areas) where workers may be exposed to potential combustible dust flash fire hazards, then citations under 29 CFR 1910.132(a) may be appropriate. Another example of a situation in which a citation under 29 CFR 1910.132(a) may be issued, are where workers (not wearing FR clothing) are potentially exposed to flash fires when cleaning equipment or replacing bags in a baghouse containing hazardous levels of combustible dust, and the workers may be exposed to a flash fire.

   It is important to document whether a reasonable person familiar with the

circumstances would recognize hazards from combustible dust. Industry practice requires FR clothing when employees are potentially exposed to flash fire hazards, including those from combustible dust. NFPA 2113, *Standard on Selection, Care, Use and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel against Flash Fire* is an industry standard which applies to chemical, refining, and terminal facilities with flash fire hazards. NFPA 2113 explains when FR clothing should be used by industrial personnel exposed to flash fire hazards. It also includes information on the selection of flame-resistant clothing, including the conduct of a hazard analysis to determine when flame- resistant clothing should be worn. NFPA 2113 provides explanatory information on an employer's need to define those facilities, areas of their workplace, and tasks necessitating the wearing of FR clothing/garments. However, 29 CFR 1910.132(a) may be cited only for failure to provide, maintain, and ensure the use of PPE.

8. Electrical violations. If the laboratory test results indicate that the submitted dust meets the criteria for Class II (see Class II Test methodology in the OSHA Technical Manual combustible dust chapter), and if the location where the dust was present falls under any of the Class II location definitions, then citations under 29 CFR 1910.307 are appropriate (see the Class II definition in 29 CFR 1910.399). Note that the 29 CFR 1910.307(c) allows a variety of approaches for ensuring electrical equipment is appropriate for a hazardous (classified) area, including Class II areas. See NFPA 70, Article 502 for guidance on safe equipment design and installation for Class II services. These guidelines constitute an interpretation of the requirement that the electrical equipment be safe for the hazardous (classified) location 29 CFR 1910.307(c)(3).

   However, if violations involving Class I or III locations are found in the course of conducting an inspection under this LEP, then citations should also be issued. CSHOs should note that a Class II test is not needed to cite Class I or Class III locations. (See the Class I and III definitions in 29 CFR 1910.399).

   Citations issued for electrical violations shall be adequately documented in the case file. Such documentation must include the location and type of potential electrical ignition sources, the type and condition of electrical equipment located in the area, and information indicating that the equipment is not approved or safe for the location. CSHOs should note that under 29 CFR 1910.307(b), "All areas designated as hazardous (classified) locations under the Class and Zone system and areas designated under the Class and Division system established after August 13, 2007, shall be properly documented. This documentation shall be available to those authorized to design, install, inspect, maintain, or operate electrical equipment at the location."

9. Powered Industrial Trucks (PITs). PIT violations are issued under 29 CFR 1910.178(c)(2)(ii) and (vi)-(ix) and 1910.178(m)(11). The 1910.178(c)(2) provisions specify the types of PITs, such as EX, which are allowed. For definitions of these types see 29 CFR 1910.178(b).

10. Welding, cutting, and brazing. For violations involving welding, cutting, and brazing operations, cite 29 CFR 1910.252 (general welding and cutting) (see, in particular, (a)(2)(vi)(C), prohibiting cutting and welding in explosive atmospheres, including mixtures of flammable dusts with air), and 29 CFR 1910.253 (oxygen-fuel gas welding and cutting) [see, in particular, (c)(2)(ii) and (iv) (only the second sentence) and (f)(5)(i)(B)], and 1910.254 (arc welding) [see, in particular, (b)(2)(F)].

11. Warning sign violations. If safety instruction signs are missing on equipment, or at the entrance to places where explosive atmospheres may occur, then issue citations under 29 CFR 1910.145(c)(3).

12. Hazard communication violations. The Hazard Communication standard, 29 CFR 1910.1200, requires all employers to provide information to their employees about the hazardous chemicals to which they are exposed by means of a hazard communication program, labels, and other forms of warning, as well as safety data sheets (SDS), other information, and training. The definition of "hazardous chemical" in 29 CFR 1910.1200(c) includes combustible dust. Cite violations of this standard for failure to comply with its requirements with respect to any chemical known to be present in the workplace in such a manner that employees may be exposed to combustible dusts during normal conditions of use or in a foreseeable emergency. See 29 CFR 1910.1200(c).

    Equipment containing combustible dusts, including drums and other containers used to collect dusts recovered from dust collectors and cyclones, must be appropriately labeled in accordance with 29 CFR 1910.1200(f)(6) (see 29 CFR 1910.1200 Appendix C Section C.4.30 - Label elements for OSHA defined hazards – combustible dust).

    The standard requires chemical manufacturers and importers to develop or obtain a SDS for each hazardous chemical they produce or import (see 29 CFR 1910.1200(g)(1)). CSHOs should refer to the memorandum dated December 27, 2013, in determining whether manufacturers or importers have properly classified their products for combustible dust hazards and whether they are in compliance with the obligations of 29 CFR 1910.1200(d) for combustible dust. Note that employers may be manufacturers, generators, handlers, and/or users of combustible dusts.

    CSHOs should evaluate compliance with 29 CFR 1910.1200(g)(2)-(5) by examining a sample of SDSs. Where the hazard for the chemical or its by-products is combustible dust, SDSs must list "combustible dust" as a hazard "not otherwise classified," with signal word "warning" and hazard statement "may form combustible dust concentrations in air." No pictograms or precautionary statements are required for combustible dust hazards.

    If SDSs are not updated when new information becomes available, they are considered deficient [see 29 CFR 1910.1200(g)(5)]. If the SDSs are found deficient with respect to the hazards related to combustibility or explosibility of

the dust. CSHOs must refer to and follow the guidance provided in CPL 02-02-079, Inspection Procedures for the Hazard Communication Standard (HCS 2012).

13. Egress violations. Cite egress violations under 29 CFR 1910, Subpart E – Means of Egress, particularly 29 CFR 1910.33-37.

14. Fire protection violations. Citations for violations of 29 CFR 1910.156 (fire brigades) and 29 CFR 1910.157 (portable fire extinguishers) must be issued where violations of these standards are found. 29 CFR 1910.156 only applies to the context of this LEP if the employer has a fire brigade or industrial fire department. The fire extinguisher provisions of 29 CFR 1910.157 do not apply where the employer requires the evacuation of employees in the event of fire, has an emergency action plan meeting the requirements of 29 CFR 1910.38, and has a fire prevention plan that meets the requirements of 29 CFR 1910.39.

15. Bakery equipment violations. When inspecting bakery equipment in a bakery covered under 29 CFR 1910.263, cite 29 CFR 1910.263(k)(2) for fire and explosion hazards in connection with sugar and spice pulverizers. The standard provides:

    All drive belts used in connection with sugar and spice pulverizers shall be grounded by means of metal combs or other effective means of removing static electricity. All pulverizing of sugar or spice grinding shall be done in accordance with NFPA 62—1967 (Standard for Dust Hazards of Sugar and Cocoa) and NFPA 656—1959 (Standard for Dust Hazards in Spice Grinding Plants), which are incorporated by reference as specified in 29 CFR 1910.6.

    Because these NFPA standards are incorporated by reference, they are binding requirements. The specific provisions not followed by the employer should be noted in the citation. 29 CFR 1910.263(d), *flour- handling equipment*, has two relevant provisions.

    29 CFR 1910.263(d)(3)(v) provides: "All dumpbin and blender hoods shall be of sufficient capacity to prevent circulation of flour dust outside the hoods." 29 CFR 1910.263(d)(ii) provides in pertinent part: "Storage bins shall be provided with gaskets and locks or latches to keep the cover closed, or other equivalent devices in order to insure the dust tightness of the cover…."

16. Sawmill violations. Citations for violations of 29 CFR 1910.265(c)(20) (ii)-(v) should be considered for combustible dust hazards in this industry. The standards provide as follows:

    - Collecting systems. All mills containing one or more machines that create dust, shavings, chips, or slivers during a period of time equal to or greater than one-fourth of the working day, shall be equipped with a collecting system. It may be either continuous or automatic and shall be of sufficient strength and capacity to enable it to remove such refuse from points of operation and immediate vicinities of machines and

work areas.

- Exhaust or conveyor systems. Each woodworking machine that creates dust, shavings, chips, or slivers shall be equipped with an exhaust or conveyor system located and adjusted to remove the maximum amount of refuse from the point of operation and immediate vicinity.

- Dust chambers. Exhaust pipes shall not discharge into an unconfined outside pile if uncontrolled fire or explosion hazards are created. They may empty into settling or dust chambers, designed to prevent the dust or refuse from entering any work area. Such chambers shall be constructed and operated to minimize the danger of fire or dust explosion.

17. Pulp and Paper Mills. Pulp and paper mills shall have means of controlling dust in accordance with 29 CFR 1910.261(f)(5), which requires compliance with American National Standards Z33.1—1961, Z87.1—1968, and Z88.2—1969. In addition, 29 CFR 1910. 261(f)(2)(iv) requires cutters, shredders, and dusters to have exhaust ventilation in accordance with American National Standard Z9.2—1960. These incorporated ANSI standards are binding requirements.

18. Spray Finishing. 29 CFR 1910.107(l) requires facilities applying powder coatings to 1) use ventilation to maintain airborne combustible dusts below the MEC [29 CFR 1910.107(l)(2)], and 2) maintain surfaces to reduce accumulations of powder coating dusts [29 CFR 1910.107(l)(4)].

19. Agriculture. The only provisions which may be cited in connection with agricultural operations are as follows:

- Hazard communication – 29 CFR 1910.1200;
- Storage and handling of anhydrous ammonia – 29 CFR 1910.111(a) and (b);
- Logging operations – 29 CFR 1910.266;
- Slow-moving vehicles – 29 CFR 1910.145;
- Cadmium – 29 CFR 1910.1027;
- Retention of DOT markings, placards and labels – 29 CFR 1910.1201;
- UAC R614-3 Farming Operations Standards (and other applicable UAC R614 rules); and
- the General Duty Clause – Utah Code Annot. § 34A-6-201(1)(a).

Facilities in NAICS 115114, Postharvest Crop Activities (except Cotton Ginning), listed in Appendix B, are engaged in agricultural operations.

Because 29 CFR 1910.22(a) and 29 CFR 1910.176(c) do not apply to

agricultural operations, the General Duty Clause should be applied to dust accumulations hazards and hazards associated with dust collection and handling systems in agricultural operations.

In closing conferences, abatement discussions during settlements, and when issuing Notices in Lieu of Citations, UOSH should encourage employers to perform dust hazard analyses (DHAs) of their combustible dust producing processes to ensure that all such hazards have been identified and adequately addressed (see NFPA 652 for guidance on DHAs).

B. Program Evaluation.

OIS case files under this LEP shall be coded "DUSTEXPL." They can be retrieved for program evaluation purposes based on UOSH evaluation priorities. Program evaluation may be conducted on a periodic basis.

C. Outreach.

Outreach programs that support UOSH enforcement efforts are strongly encouraged. Suggested outreach products and activities include but are not limited to the following:

1. Letters and news releases announcing implementation of the LEP.

2. Seminars on combustible dust topics that are tailored for specific audiences, such as employers, employee groups, local trade unions, apprentice programs, and equipment manufacturers. Local fire department staff may be invited to participate.

3. Partnerships and alliances, such as those involving employers within the same industry (e.g., foundries), to share successes and technical information concerning effective means of controlling or eliminating potential dust explosion hazards at their facilities.

4. Collaboration with UOSH cooperative program participants, including Voluntary Protection Programs, On-Site Consultation programs, Strategic Partnership Program, and Alliance Program.

D. OIS Coding Instructions.

1. For all enforcement activities (programmed inspections, complaints, fatality/catastrophes, and referrals) and compliance assistance (Compliance Assistance Activity Form) conducted under this LEP, "DUSTEXPL" will be selected in the Inspection Emphasis Programs field under State Emphasis Program.

2. In the Inspection Emphasis Programs field of OIS, select all NEP/LEP OIS codes applicable to the inspection. For example, combustible dust inspections conducted under the Amputations LEP should be entered as "GUARDLOCK," as well as "DUSTEXPL" in OIS.

3. All consultation activities (Request, Visit, and Compliance Assistance) conducted in response to this LEP must include "DUSTEXPL" in the State Emphasis Program field in OIS.

4. Consultation activities related to dust hazards under other LEPs must be entered for all LEPs. For example, consultation visits related to combustible dust hazards conducted under the Amputations LEP should be entered as "GUARDLOCK," as well as "DUSTEXPL" in OIS.

XI. Appendices.

The following appendices are provided as guidance for the inspection of facilities generating and handling combustible dust. Additional reference materials, which are not part of this directive, are available through the OSHA Technical Manual combustible dust chapter on the OSHA extra-net.

Appendix A: NFPA Standards/Publications and FM Global Datasheets Relevant to Combustible Dust Hazard Controls

Appendix B: Industries with Heightened Potential for Combustible Dust Hazards

Appendix C: Sample Citations

Appendix A: NFPA Standards/Publications and FM Global Datasheets for Combustible Dust Hazard Controls

NFPA Number	Title
33	Standard for Spray Application Using Flammable or Combustible Materials
61	Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities
68	Standard on Explosion Protection by Deflagration Venting
69	Standard on Explosion Prevention Systems
70	National Electrical Code
77	Recommended Practice on Static Electricity
85	Boiler and Combustion Systems Hazards Code
86	Standard for Ovens and Furnaces
91	Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids
484	Standard for Combustible Metals
499	Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas
505	Fire Safety Standard for Powered Industrial Trucks
652	Standard on the Fundamentals of Combustible Dust
654	Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids
655	Standard for Prevention of Sulfur Fires and Explosions
664	Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities.
850	Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations
FM Global Datasheet No.	**Title**
5-1	0BElectrical Equipment in Hazardous (Classified) Locations
5-8	Static Electricity
6-9	Industrial Ovens and Dryers
6-17	Rotary Kilns and Dryers

7-4	Paper Machines and Pulp Dryers
7-10	Wood Processing and Woodworking Facilities
7-17	Explosion Protection Systems
7-27	Spray Application of Ignitable and Combustible Materials
7-36	Pharmaceutical Operations
7-73	Dust Collectors and Collection Systems
7-76	Prevention and Mitigation of Combustible Dust Explosions and Fire
7-78	Industrial Exhaust Systems
7-85	Metals and Alloys
CCPS Books	**Title**
	Guidelines for Safe Handling of Powders and Bulk Solids, November 2004
	Guidelines for Combustible Dust Hazard Analysis, May 2017
	Understanding Explosions, July 2003
	Deflagration and Detonation Flame Arresters, May 2002

Appendix B: Industries with Heightened Potential for Combustible Dust Hazards

NAICS	Industry
115111	Cotton Ginning
115114	Postharvest Crop Activities (except Cotton Ginning)
221320	Sewage Treatment Facilities
311111	Dog and Cat Food Manufacturing
311119	Other Animal Food Manufacturing
311211	Flour Milling
311212	Rice Milling
311221	Wet Corn Milling
311230	Breakfast Cereal Manufacturing
311314	Cane Sugar Manufacturing
311313	Beet Sugar Manufacturing
311812	Commercial Bakeries
311930	Flavoring Syrup and Concentrate Manufacturing
311942	Spice and Extract Manufacturing
313311	Broadwoven Fabric Finishing Mills
316110	Leather and Hide Tanning and Finishing
321113	Sawmills
321212	Softwood Veneer and Plywood Manufacturing
321214	Truss Manufacturing
321219	Reconstituted Wood Product Manufacturing
321911	Wood Window and Door Manufacturing
321912	Cut Stock, Resawing Lumber, and Planing
321918	Other Millwork (including Flooring)
321920	Wood Container and Pallet Manufacturing
321992	Prefabricated Wood Building Manufacturing
321999	All Other Miscellaneous Wood Product Manufacturing
322110	Pulp Mills
322121	Paper (except Newsprint) Mills
322291	Sanitary Paper Product Manufacturing
322299	All Other Converted Paper Product Manufacturing
324199	All Other Petroleum and Coal Products Manufacturing
325130	Synthetic Dye & Pigment Manufacturing
325194	Cyclic Crude Intermediate, Gum and Wood Chemical Manufacturing

325193	Ethyl Alcohol Manufacturing
325211	Plastics Material and Resin Manufacturing
325212	Synthetic Rubber Manufacturing
325221	Cellulosic Organic Fiber Manufacturing
325510	Paint and Coating Manufacturing
325611	Soap and Other Detergent Manufacturing
325910	Printing Ink Manufacturing
325991	Custom Compounding of Purchased Resins
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing
326113	Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing
326140	Polystyrene Foam Product Manufacturing
326150	Urethane and Other Foam Product (except Polystyrene) Manufacturing
326199	All Other Plastics Product Manufacturing
326211	Tire Manufacturing (except Retreading)
326291	Rubber Product Manufacturing for Mechanical Use
326299	All Other Rubber Product Manufacturing
327910	Abrasive Product Manufacturing
331221	Rolled Steel Shape Manufacturing
331313	Alumina Refining and Primary Aluminum Production
331314	Secondary Smelting and Alloying of Aluminum
331318	Other Aluminum Rolling, Drawing & Extruding
331410	Copper Rolling, Drawing, Extruding, and Alloying
331523	Nonferrous Metal Die-Casting Foundries
331524	Aluminum Foundries (except Die-Casting)
331529	Other Nonferrous Foundries (except Die-Casting)
332117	Powder Metallurgy Part Manufacturing
332312	Fabricated Structural Metal Manufacturing
332321	Metal Window and Door Manufacturing
332322	Sheet Metal Work Manufacturing
332618	Other Fabricated Wire Product Manufacturing
332710	Machine Shops
332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers
332813	Electroplating, Plating, Polishing, Anodizing, and Coloring
332999	All Other Miscellaneous Fabricated Metal Product Manufacturing
333514	Special Die and Tool, Die Set, Jig, and Fixture Manufacturing

333992	Welding and Soldering Equipment Manufacturing
336320	Motor Vehicle Electrical and Electronic Equipment Manufacturing
337110	Wood Kitchen Cabinet and Countertop Manufacturing
337121	Upholstered Household Furniture Manufacturing
337122	Non-upholstered Wood Household Furniture Manufacturing
337127	Institutional Furniture Manufacturing
337212	Custom Architectural Woodwork and Millwork Manufacturing
337215	Showcase, Partition, Shelving, and Locker Manufacturing
339950	Sign Manufacturing
339995	Burial Casket Manufacturing
339999	All Other Miscellaneous Manufacturing
423310	Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers
423930	Recyclable Material Merchant Wholesalers
424510	Grain and Field Bean Merchant Wholesalers
424910	Farm Supplies Merchant Wholesalers
493130	Farm Product Warehousing and Storage
562920	Materials Recovery Facilities
811420	Reupholstery and Furniture Repair

Appendix C: Sample Citations

General Duty Clause Violations

Note that all four elements of a violation of the General Duty Clause [Section 34A-6-201(1)(a) of the Utah OSH Act] must be documented in accordance with UOSH FOM requirements. Industry standards, such as NFPA dust publications, FM Global and CCPS books, as well as the employer's possession of SDSs, can be used to document and describe the hazards that are recognized by employers. Employer documents can be used to impute knowledge to the employer (e.g., previous insurance recommendations, investigation reports from prior incidents, equipment work orders, employer's documents illustrating compliance with industry standards and recognized practices for controlling combustible dust hazards, employer's participation on code committees, etc.). The CSHO shall also document employee exposure(s) to the hazard, employer and industry knowledge, and feasible means of abatement.

Example citation:

Section 34A-6-201(1)(a) of the Utah OSH Act: Each employer shall furnish to each of its employees employment and a place of employment that are free from recognized hazards that are causing or are likely to cause death or serious physical harm to its employees.

(A) Each employer did not furnish to each if its employees employment and a place of employment that were free from recognized hazards as required.

- Employees were exposed to fire, flash fire, deflagration, and/or explosion hazards, which were likely to cause severe burns, from unvented dust collectors located inside a building.
    - SMK Building – An unvented combustible dust collector with no explosion protection system was located inside the SMK building.
    - Day Bin Building – A large dust collector collecting combustible dust from multiple day bins and without an explosion protection system was located inside the Day Bin Building.

AMONG OTHER METHODS, A FEASIBLE ABATEMENT METHOD TO CORRECT THIS HAZARD IS AS FOLLOWS:

a) Equipment of the dust collector located inside the SMK building with a means of explosion prevention or protection (such as deflagration venting to a safe outdoor location, deflagration venting through a listed dust retention and flame arresting device, deflagration detection and chemical suppression, etc.). See NFPA 68 and NFPA 69 for specific guidance on deflagration prevention and protection systems.

b) Equipment of the dust collector located inside the Day Bin building with a means of explosion prevention or protection (such as deflagration venting to a safe outdoor location, deflagration venting through a listed dust retention and flame

arresting device, deflagration detection and chemical suppression, etc.). See NFPA 68 and NFPA 69 for specific guidance on deflagration prevention and protection systems.

NOTE: This example language would be suitable for collectors containing non-metallic combustible dusts, which are acceptable inside buildings if equipped with appropriate explosion venting or explosion protection systems. Dry collectors in metal dust service MUST be located outside of buildings.

Housekeeping Violations

1) 29 CFR 1910.22(a)(l): The employer must ensure all places of employment, passageways, storerooms, service rooms, and walking-working surfaces are kept in a clean, orderly, and sanitary condition.

(A) The employer did not ensure all places of employment, passageways, storerooms, service rooms, and/or walking-working surfaces were kept in a clean, orderly, and/or sanitary condition.

- Grinding and Polishing Area – On or about December 17, 20XX, the area where aluminum polishing and grinding were performed had explosible aluminum dust located on the pipes in the ceiling, the roof structure, and masonry walls.

2) 29 CFR 1910.22(a)(2): The employer must ensure the floor of each workroom is maintained in a clean and, to the extent feasible, in a dry condition. When wet processes are used, drainage must be maintained and, to the extent feasible, dry standing places, such as false floors, platforms, and mats must be provided.

(A) The floor of each workroom was not maintained in a clean and/or dry condition and/or when wet processes were used, drainage was not maintained and/or dry standing places were not provided as required.

- Grinding and Polishing Area – On or about May 7, 20XX, explosive dust was on the floor of the area where aluminum polishing and grinding were performed.

Electrical Violations

1) 29 CFR 1910.307(c): Electrical installations. Equipment, wiring methods, and installations of equipment in hazardous (classified) locations shall be intrinsically safe, approved for the hazardous (classified) location, or safe for the hazardous (classified) location.

(A) Equipment, wiring methods, and installations of equipment in hazardous (classified) locations were not intrinsically safe, approved for the hazardous (classified) location, and/or safe for the hazardous (classified) location.

- Robot Polishing and Grinding Area – Open motor fans, electrical outlet boxes, breaker panels, disconnect switches, normal lighting snap switches, overhead lighting, robot control panels, stand belt grinders, and portable radios in a Class II, Division 1 location **(Note: each may be cited as a separate instance),** were not intrinsically safe, approved for a Class II, Division I, location, or safe for a Class II, Division I, location, on or about November 16, 20XX.

- Half Round Area – Electrical equipment including, but not limited to, overhead lights, circuit breaker panels, disconnect switches and outlets, in Class II, Division I, locations, was not intrinsically safe, approved for a Class II, Division I, or safe for a Class II, Division I, location, on or about January 11, 20XX.

- Mixing Department – A vacuum used in a Class II, Division 1 location was not intrinsically safe, approved for a Class II, Division 1, location, or safe for a Class II, Division 1, location, on or about January 11, 20XX.

Personal Protective Equipment Violations

1) 29 CFR 1910.132(a): Application. Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

   (A) Protective equipment was not provided, used, and/or maintained as required.

   - Aluminum Grinding and Polishing Area – Employees did not wear flame-retardant and non-static-generating clothing in an area where combustible aluminum dust was present, on or about November 16, 20XX.