AGRICULTURAL AND FOOD DUST HAZARD ANALYSIS (DHA) CHECKLIST

Completed document and associated reference material meets the requirements for documentation of "Dust Hazard 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. [652, 2019]. It can be used at facilities that have simple conversion technologies, such as, but not limited to, grain elevators, flour mills, mix plants, cereal plants, and dough plants.

Date DHA completed: _____

Date DHA modified: _____

Date DHA reviewed: _____

For new processes that will be constructed and facility processes that are undergoing significant modification, the owner/operator shall complete DHAs as part of the project. For existing processes and facility compartments that are not undergoing significant modification, the owner/operator shall schedule and complete DHAs of bucket elevators, conveyors, grinding equipment, spray dryer systems, and dust collection systems by January 1, 2022. [61:7.1]

Facility owner: _____

Facility operator: _____

Person responsible for DHA: _____

Others involved in DHA: _____

The DHA shall be performed or led by a qualified person. [652:7.2.2] The owner/operator of a facility where materials determined to be combustible or explosible are present in an enclosure shall be responsible to ensure a DHA is completed in accordance with the requirements. [652:7.1.2]

1.0 MATERIALS EVALUATION		Yes	No	N/A	Comments	Action	Date Due
1.1	Is there a comprehensive list of all materials at the facility that present a credible combustible dust hazard?						
Hazard identification is based on the most recent Chapter 5 of NFPA 61. The list of materials should be kept in electronic or paper form and should reference the methods used to define hazards. In process, half product and mixes that contain dust less than 800 microns should also be listed and evaluated.							
1.2	Does the list include material data: sieve analysis, K_{St} testing, MIE (if warranted by K_{St} testing), and references used to define material characteristics, etc.?						
1.3	Location of list:						
1.4	Do any of the materials on the list have a K_{St} greater than 200?						
	If yes, where are these materials stored, transported, and used?						
Hazard identification is based on several factors. A higher than 200 K_{St} means the material is more energetic than a typical agricultural or food dust, and therefore these materials should be first on any facilities evaluation list. If all materials have similar K_{St} and other characteristics, the evaluation of the hazard can be simplified to a typical general case.							
1.5	Do any of the materials on the list have an MIE of less than 30 mJ?						
	If yes, where are these materials stored, transported, and used?						
If the MIE is found to be less than 30 mJ, an unusual static energy risk exists, and the facility must be prepared to institute special handling procedures to prevent dust ignition.							
1.6	Have P&IDs or similar documents been used to identify equipment and processes that need to be evaluated?						
Where are the processes and facility areas where flash fire and explosion hazards potentially exist?							
1.7	Location of system P&IDs highlighting equipment to be evaluated:						
1.8	Location of facility drawing illustrating areas of potential concern:						
1.9	Do you have a breakdown of the materials used in each process or facility area?						
	Where is this information kept?						

The DHA shall include the following:
(1) Identification and evaluation of the process or facility areas where fire, flash fire, and explosion hazards exist.
(2) Where such a hazard exists, identification and evaluation of specific fire and deflagration scenarios shall include the following:
(a) Identification of safe operating ranges.
(b) Identification of the safeguards that are in place to manage fire, deflagration, and explosion events.
(c) Recommendation of additional safeguards where warranted, including a plan for implementation [652:7.3.1]

4.2.1.2 The objectives stated in NFPA 61, Section 4.2, shall be deemed to be met when, consistent with the goal in 4.2.1 and the provisions in NFPA 61, Sections 1.4 and 1.5, the following have been achieved:
(1) The facility, processes, and equipment are designed, constructed, and maintained in accordance with the prescriptive criteria set forth in this standard.
(2) The management systems set forth in this standard are implemented.

If the material evaluated matches that of a typical agricultural of food dust, use of the prescriptive requirements in NFPA 61 meets the minimum requirements for mitigation of the hazard. If not, best practice requires a hazard analysis method appropriate to the size, complexity, and hazards of the process.

2.0 BUILDING AND FACILITY DESIGN (NFPA 61, Section 9.2)		Yes	No	N/A	Comments	Action	Date Due
NFPA 70 defines location, hazard class, division, and group in Article 500.5. Class II locations are those that are hazardous because of the presence of combustible dust. In Division 1 locations, the hazard is present in quantities sufficient to produce explosive or ignitible mixtures. In Division 2 locations, the hazard might be present under abnormal operations. Group G includes agricultural and food dusts. "Unclassified" is used to describe low-hazard locations and areas with management and sanitation plans that prevent dust accumulation.							
This assessment is a best practice and is seen as a method of understanding what flaws a current structure has compared to NFPA 61 requirements prior to the 2020 edition.							
2.1	Has the construction, modification, renovation, change of use, or change of occupancy classification of all buildings						

This assessment is a best practice and is seen as a method of understanding what flaws a current structure has compared to NFPA 61 requirements prior to the 2020 edition							
2.1	Has the construction, modification, renovation, change of use, or change of occupancy classification of all buildings and structures complied with all governing building codes?						
2.2	Has a qualified person evaluated the facility and determined locations that are Class II, Group G, Division 1 or Division 2, and where the facility should be considered unclassified due to cleaning practices or absence of combustible dust?						

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2.0 BUILDING AND FACILITY DESIGN (NFPA 61, Section 9.2, continued)		Yes	No	N/A	Comments	Action	Date Due
2.3	Has a drawing or map of the rated areas been developed?						
	Where is this information kept?						
2.4	Are all areas determined to be Class II, Division 1 or 2 in full compliance with applicable requirements related to *NFPA 70*, Article 502?						
2.5	Do electrical wiring and power equipment meet all applicable requirements of *NFPA 70*, including those for hazardous locations, based on a review by a knowledgeable person?						
2.6	Are enclosures built to segregate dust explosion hazard areas from other areas designed such that they will not fail before the explosion pressure is vented to a safe outside location?						
2.7	Are there any areas classified as Class II, Group G, Division 1 that use masonry for the construction of exterior walls or roofs?						
	If yes, are the masonry walls designed for explosion resistance to preclude failure of these walls so the explosion pressure can be vented safely to the outside?						
2.8	Are structures housing personnel-intensive areas not directly involved in operations located remote from storage silos and headhouse structures, with the exception of small control rooms?						
2.9	Are any silos and headhouses constructed of reinforced concrete?						
	If yes: (a) Are they separated from personnel-intensive areas by at least 30 m (100 ft)?						
	(b) Do the structures have inside elevator legs?						
	If yes, is the structure equipped with explosion venting, or are the inside elevator legs equipped with explosion protection?						
2.10	Is a lightning protection system provided?						
	If yes, is it in accordance with NFPA 780?						
2.11	Are there any areas where separation is used to limit the dust explosion hazard or deflagration hazard area within a building? If yes, proceed to 2.12; if no, proceed to 2.15.						
2.12	Was the separation distance between the dust explosion or deflagration hazard area and surrounding exposures determined by an engineering evaluation, and is the distance at least 11 m (35 ft)?						
2.13	Is the separation area free of dust?						
	If no, where dust accumulations exist on any surface, is the color of the surface readily discernable?						
2.14	Are horizontal surfaces in the buildings minimized to prevent accumulations of dust in interior structural areas where significant dust accumulations could occur?						
2.15	Are storage areas larger than 465 m^2 (5000 ft^2) and containing packaging, bagging, palletizing, and pelleting equipment cut off from all other areas with fire barrier walls designed for a minimum fire resistance of 2 hours in accordance with Chapter 8 of *NFPA 5000*?						
2.16	Are warehouse areas designed in accordance with						

	in accordance with Chapter 8 of *NFPA 5000*?						
2.16	Are warehouse areas designed in accordance with *NFPA 5000*?						
2.17	Are necessary openings in fire walls and fire barriers kept to a minimum, as small as practicable, and protected with listed self-closing fire doors, fire shutters, fire dampers, or penetration seals installed in accordance with Chapter 8 of *NFPA 5000*?						
2.18	If hold-open devices are used, are they listed and designed to activate and allow the door to close upon sensing at least one of the following: (1) heat, (2) smoke, (3) flames, or (4) products of combustion?						
2.19	Is adequate means of egress provided in accordance with NFPA *101*?						
2.20	Are bin decks provided with two means of egress remote from each other, such that a single fire or explosion event will not likely block both means of egress, or is the travel distance less than 15 m (50 ft) if only one means of egress is available?						

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2.0 BUILDING AND FACILITY DESIGN (NFPA 61, Section 9.2, continued)		Yes	No	N/A	Comments	Action	Date Due
2.21	Do any MCCs require a pressurization system and alarm installed per code?						
2.22	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
3.0 IGNITION SOURCE CONTROL (NFPA 61, Section 9.4)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**
3.1	Have grounding and bonding of pipes and equipment been universally applied to the system and its components to ensure static will be dissipated? (resistance to ground ≤ 1 megohm)						
3.2	Does any motor-driven equipment meet requirements of NFPA 505 and 9.4.9.2.1 through 9.4.9.6 of NFPA 61?						
3.3	Are antifriction bearings used on all machinery, conveyors, legs, and processing equipment?						
3.4	Are bearings kept free from dust, product, and excessive lubricant?						
3.5	Are bearings that are directly exposed to a dust deflagration hazard monitored for overheating?						
3.6	What form does the monitoring take? Describe the program or process and where information is kept.						
3.7	Are bearings on legs and conveyors located outside the machinery enclosures and protected from dust exposure?						
3.8	Are bearings accessible for inspection?						
3.9	Are support bearings on screw conveyors and other similar equipment sealed?						
3.10	Are pneumatic conveying systems installed in accordance with 9.3.3 and 9.3.5 through 9.3.9 of NFPA 654?						
3.11	Are all system components electrically conductive?						
3.12	Is a hot work program in place for dust hazard–rated areas to prevent hot work from being conducted, including the use of nonrated electric, pneumatic, or powder-driven tools, except when no dust-producing operations are taking place, and no combustible materials or dust is located in the vicinity of the operation? (See 21.26 - 21.42.)						
3.13	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
4.0 BINS, TANKS, AND SILOS (NFPA 61, 9.3.9)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**

4.0 BINS, TANKS, AND SILOS (NFPA 61, 9.3.9)		Yes	No	N/A	Comments	Action	Date Due
4.1	Does the construction of bins, tanks, and silos conform to applicable local, state, or national codes?						
4.2	Where explosion relief vents are provided on bins, tanks, and silos, are they rated to operate before the container walls fail?						
4.3	Do access doors or openings meet the following requirements: (1) They shall be provided to permit inspection, cleaning, and maintenance and to allow effective use of fire-fighting techniques in the event of fire within the bin, tank, or silo. (2) They shall be designed to prevent dust leaks.						
4.4	Where a bin, tank, or silo has a personnel access opening provided in the roof or cover, is the smallest dimension of the opening at least 610 mm (24 in.)?						
4.5	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
5.0 MARINE TOWERS (NFPA 61, 9.2.8)		Yes	No	N/A	Comments	Action	Date Due
Does the facility or process include marine towers? If yes, complete 5.0. If no, skip to 6.0.							
5.1	Has the location of marine towers been included in the map and assessment in 2.2 and 2.3?						
5.2	Are marine towers constructed of noncombustible materials?						

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5.0 MARINE TOWERS (NFPA 61, 9.2.8, continued)		Yes	No	N/A	Comments	Action	Date Due
5.3	Are movable marine towers provided with automatic or manually operated brakes?						
5.4	Are movable marine towers provided with automatic or manual rail clamps?						
5.5	Do rail clamps activate when the wind velocity is great enough to cause movement of the tower, even when brakes or gear drives are preventing the rail wheels from turning?						
5.6	Is equipment to monitor wind velocity installed on movable marine towers?						
5.7	Do movable marine towers have provisions for emergency tie-downs?						
5.8	For marine vessel loading, do conveyors, spouts, and drags have safety devices to prevent the equipment from falling if the operating cable(s) break?						
5.9	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
6.0 CONVEYORS, SPOUTS, AND THROWS OF MATERIAL (NFPA 61, 9.3.15)		Yes	No	N/A	Comments	Action	Date Due
6.1	Are bulk material conveyor belts designed to either relieve or stop if the discharge end becomes plugged?						
6.2	Are bulk material conveyor belts (grain handling or similar) equipped with belt alignment and hot bearing sensors at the head and tail?						
6.3	Are screw, drag, or en-masse conveyors fully enclosed in metal housings and designed to either relieve or stop if the discharge end becomes plugged?						
6.4	Are fixed spouts dusttight?						
6.5	Are combustible linings used in spouts or other handling equipment in any location other than wear points or impact points?						
	Do ducts or conveyors that penetrate fire-rated walls or						

6.6	Do ducts or conveyors that penetrate fire-rated walls or partitions have necessary mitigation to prevent fire propagation from area to area?						
6.7	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
7.0 GENERAL EQUIPMENT DESIGN (NFPA 61, 9.3.3.2)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**
7.1	Are any ingredient transport systems present in the process per NFPA 61, 3.3.22? (This system shall be permitted to be installed inside of a building without explosion protection where all of the following requirements from 9.3.3.2.4 are met: (1) The system is a negative or positive pressure pneumatic conveying system. (2) The system, through its design, is isolated from the addition of mechanical or electrical energy and process activities such as cooking or drying, by positive means, such as rotary valves, filters, normally closed valves, or sealed hoppers, from outside events that could trigger an event such as a flash fire or deflagration. (3) The system is not a bulk raw grain transportation pneumatic system or dust collection system.)						
7.2	Are magnets and screens located upstream of equipment and arranged where they can be easily inspected and cleaned?						
7.3	Are e-stops installed and routinely tested to ensure appropriate function?						
7.4	On normal shutdown of any process that contains combustible dust, does the system maintain design air velocity until the material is purged from the system?						
7.5	If a conveyor runs adjacent to buildings or structures of combustible construction or adjacent to walls with vents, windows, or spout or conveyor openings, are there seals, chokes, or fast-closing valves to minimize propagation potential through these openings?						

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7.0 GENERAL EQUIPMENT DESIGN (NFPA 61, 9.3.3.2, continued)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**
7.6	Are all connected fans suitable for material handling?						
7.7	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
8.0 PIPING, VALVES, AND BLOWERS (NFPA 61, 9.3.3.3)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**
Positive- and negative-type pressure systems are permitted. Where the blower discharge pressure and its conveying system are designed to operate at gauge pressures exceeding 103 kPa (15 psi), the system shall be designed in accordance with Section VIII of ASME *Boiler and Pressure Vessel Code*.							
8.1	Are all piping and tubing systems airtight, dusttight, and grounded? (resistance to ground ≤ 1 megohm)						
8.2	Are all piping and tubing systems properly supported to include the weight of material in a full or choked position, and can they be disassembled for cleaning and unchoking in a safe and efficient manner?						
8.3	Are all pressure- and vacuum-relief valves located, designed, and set to relieve pressure to protect system components?						
8.4	Are multiple-direction valves of airtight and dusttight construction and sized to effect a positive diversion of the product, and does diversion in one direction seal all other directions from air, dust, or product leakage?						
	Are there any deficient or nonconforming items identified?						

	[illegible]						
8.5	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
9.0 RECEIVING AND SHIPPING CONVEYANCES (NFPA 61, 9.3.3.4)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**
9.1	Do all transport modes such as railcars (hopper cars, boxcars, or tank cars) and trucks (both receiving and shipping in bulk), into which or from which potentially combustible commodities or products are pneumatically conveyed, electrically bonded to the plant ground system, or earth grounded? (resistance to ground ≤ 1 megohm)						
9.2	Are all systems protected with filters on the inlet air used for transporting the combustible material pneumatically?						
9.3	Are all trucks, railcars, and other containers being filled provided with filters designed to prevent dust liberation into the fill building or structure?						
9.4	Are unloading systems protected with magnets or magnet detection?						
9.5	Are receiving systems equipped with one or more devices (e.g., grating, wire mesh screens, permanent magnets, listed electromagnets, pneumatic separators, or specific gravity separators) to minimize or eliminate tramp material from the product stream?						
9.6	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
10.0 DUST COLLECTION SYSTEMS PRESCRIPTIVE REQUIREMENTS (NFPA 61, 9.3.3.5)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**
10.1	Do any fans or blowers transport combustible dust through the fan or blower?						
	If yes, are fans built of spark-resistant construction?						
10.2	Are any dust control devices attached to equipment that grind, pulverize, mill, or hammer mill agricultural or food materials that are combustible isolated from other systems?						
	If no, is the manifolded dust equipment attached only to equipment that is used for sizing of oilseed meals or grain hulls?						
10.3	Does the dust collection system for hoppers and pits effectively control the dust and prevent it from leaving the system?						

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10.0 DUST COLLECTION SYSTEMS PRESCRIPTIVE REQUIREMENTS (NFPA 61, 9.3.3.5, continued)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**
10.4	Is the dust collection system interlocked with related machinery so that it starts up before the machinery and prevents machinery operation when out of service?						
10.5	Is there an alarm (visual or audible) that is tripped when a dust collection system collecting combustible dust is shut down?						
	Does the alarm trigger a shutdown process?						
	If the collection system emergency vents or suppression is activated by an explosion, does the system shut down?						
10.6	Is differential pressure across filter media tracked, and is the media changed based on the readings observed?						
10.7	Are all dust bins or tanks that store grain dust located outside the building structure, constructed of noncombustible material, and isolated with rotary valves						

10.8	Are all dust collectors located outside the facility and isolated with rotary valves or similar from the other portions of the system? If yes, skip to 10.10.						
10.9	Do all dust collectors located inside the building have deflagration venting based on NFPA 68 and/or an explosion suppression system based on NFPA 69? If no:						
	(a) Do these dust collectors handle only material generated as a by-product to removing moisture from an air stream? (e.g., coolers, extruders, wet grain flakes)						
	(b) Are these dust collectors located on the top of a bin and do they form a bin vent as defined in NFPA 61?						
	(c) Are the filters used only for classifying agricultural or food products with air (air classifier or purifiers)?						
	Is exhaust air from dust collectors/receivers returned to the building? If yes, see 14.0.						
10.10	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
11.0 DUCT SYSTEMS PRESCRIPTIVE REQUIREMENTS (NFPA 61, 9.3.3.6)		Yes	No	N/A	Comments	Action	Date Due
11.1	Does the duct ever contain enough dust to support a deflagration (above 25% MEC)?						
11.2	Does the system conveying velocity, as designed, ensure that the interior surfaces of all piping or ducting is free of accumulations under all normal operating modes?						
11.3	Are flexible connections static-dissipative, bonded and grounded, resistance to ground ≤ 1 megohm?						
11.4	Is the duct lining noncombustible?						
11.5	Are all ducts that return air to the building inspected and cleaned at least annually?						
11.6	Are isolation devices provided to prevent deflagration propagation from equipment through upstream ductwork to the work areas?						
11.7	Have ducts that handle combustible dust particulate solids been designed and installed to conform with the requirements of NFPA 91 with the exception found in NFPA 61?						
11.8	Have nonconductive materials such as plastic or fiberglass been avoided in all duct systems that could potentially handle combustible dust?						
11.9	Does the duct draw in air from spaces where there are combustible dusts in hazardous quantities?						
11.10	Are horizontal ducts provided with access openings for the removal of combustible dusts?						
11.11	If isolation is used on the ductwork inside a building or structure, is the ductwork designed to withstand the flame speed and pressure of an isolated event?						
11.12	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						

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12.0 CENTRALIZED VACUUM CLEANING SYSTEMS (NFPA 61, 9.3.3.7)		Yes	No	N/A	Comments	Action	Date Due
Does the facility have a centralized vacuum cleaning system? If yes, complete 12.0; if no, skip to 13.0.							
12.1	On normal shutdown of the process, does the system maintain design air velocity until the material is purged from the system?						
12.2	Does the system provide minimum conveying velocities at all times, whether the system is used with single or multiple simultaneous operators?						
	If a fire detection system is incorporated into the						

12.3	If a fire detection system is incorporated into the centralized vacuum, are safety interlocks in place for air-moving devices and process operations?						
12.4	If there are manifolded pickups on the central vacuum system, are they equipped with an isolation device?						
12.5	Are the central vacuum system hose stations located at strategic points (where dust emissions are known to occur)?						
12.6	Are only static-conductive vacuum cleaning tools used, and are they properly grounded to the hose end?						
12.7	Is flexible hose properly grounded to prevent static buildup?						
12.8	Are all vacuum truck hoses and couplings static-dissipative or conductive and grounded?						
	Are there any deficient or nonconforming items identified?						
12.9	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
13.0 AIR-MATERIAL SEPARATORS (NFPA 61, 9.3.4.1.1 - 9.3.4.1.2)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**
13.1	Are all air-material separators connected to processes that are potential sources of ignition (e.g., hammer mills, ovens, direct-fired dryers, and other similar equipment regardless of location) protected by properly designed vents or suppression systems?						
13.2	Are interior separators protected so that explosion pressures will not rupture the ductwork or the device?						
13.3	Are there any devices on site smaller than 762 mm (30 in.) in diameter that are not protected because they meet the conditions found in NFPA 61, 9.3.4.1.2?						
13.4	Are AMS that handle more than 25% of the MIE of any combustible dust protected with appropriate explosion venting or inerting systems?						
13.5	Where are the explosion venting calculations or suppression design information located?						
13.6	Is there a means of preventing deflagrations from propagating down the ducts of AMS that return air to a building?						
	Are there any deficient or nonconforming items identified?						
13.7	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
14.0 RECYCLING OF FILTERED AIR (NFPA 61, 9.3.4.1.3)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**
Does the facility recycle air from air-material separators? If yes, complete 14.0; if no, skip to 15.0.							
14.1	Is the air that is returned inside the building or to air-makeup systems filtered to the efficiency of 0.02 g per dry standard cubic meter of airflow (0.008 grain per dry standard cubic foot of airflow)?						
14.2	Is the air from hammer mill filters or other devices that add energy to the system discharged outside the facility?						
14.3	Is the collector or exhaust system provided with explosion suppression or isolation to prevent deflagration from the collector from entering the building?						
	Are there any deficient or nonconforming items identified?						
14.4	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						

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15.0 BUCKET ELEVATOR LEGS (NFPA 61, 9.3.14)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**

15.0 BUCKET ELEVATOR LEGS (NFPA 61, 9.3.14)		Yes	No	N/A	Comments	Action	Date Due
Does the facility have fully enclosed bucket elevators or lifts that handle potentially combustible dust hazard materials? If yes, complete 15.0; if no, skip to 16.0 Note: Finished breakfast cereal product transported in open bottom lifts would be an example of a material NOT affected by this section							
15.1	Are any bucket elevators located fully or partially inside of a building, structure, or tunnel?						
15.2	Are bucket elevators that move combustible materials that could generate dust hazard (casing, head and boot sections, access openings, and connecting conveyances) dusttight and constructed of noncombustible materials?						
15.3	Is explosion venting or suppression provided for each elevator leg?						
	If not, is isolation provided on the feed and discharge end with deflagration isolation in accordance with NFPA 69?						
15.4	Is each leg independently driven by motor(s) and drive train(s) capable of handling the full-rated capacity of the elevator leg without overloading?						
15.5	Are line shaft drives capable of handling the full-rated capacity of all connected equipment without overloading?						
15.6	Are multiple motor drives interlocked to prevent operation of the leg upon failure of any single motor?						
15.7	Can drive start an unchoked leg under full (100%) load?						
15.8	Is each leg provided with a speed sensor device that will cut off the power to the drive motor and actuate an alarm in the event the leg belt slows to 80% of normal operating speed, and will feed to leg be stopped or diverted?						
15.9	Has proper lagging been installed on system pulleys and related devices?						
15.10	Has proper monitoring equipment been installed to ensure that hot bearings, misalignment, and other abnormal conditions are detected before they cause a dangerous situation?						
15.11	Are all spouts intended to receive grain or combustible dust hazard materials directly designed and installed to handle the full-rated elevating capacity of the largest leg feeding such spouts?						
15.12	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
16.0 PROCESSING MACHINERY AND EQUIPMENT (NFPA 61, 9.3.21)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**
16.1	Are receiving systems prior to elevator legs equipped with one or more devices such as grating, wire mesh screens, permanent magnets, listed electromagnets, pneumatic separators, or specific gravity separators?						
16.2	Are tributary spouts or conveyors that feed grain or grain products for size reduction into grinders, pulverizers, or rolling mills equipped with permanent magnets, listed electromagnets, pneumatic separators, specific gravity separators, scalpers, or screens to exclude metal or foreign matter?						
16.3	Is equipment bonded and grounded?						
16.4	Are processing machinery and components such as magnets mounted to facilitate access for cleaning?						
16.5	For starch grinding mills, is carbon steel avoided in the grinding chamber and for moving parts?						
16.6	Are the reels or sieves of screens, scalpers, and similar devices in dusttight enclosures?						
16.7	Are connecting ducts for starch-processing machinery metal or electrically conductive, nonmetallic or flexible connecting ducts having an electrical resistance not greater than 1 megohm?						
16.8	Where multiple starch material sources are connected to a common conveyor, air-material separator, or similar device, is each connected source equipped with						

	greater than 1 megajoule?						
16.8	Where multiple starch material sources are connected to a common conveyor, air-material separator, or similar device, is each connected source equipped with deflagration isolation in accordance with NFPA 69?						

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16.0 PROCESSING MACHINERY AND EQUIPMENT, continued		Yes	No	N/A	Comments	Action	Date Due
16.9	Is dry milling or grinding of starch performed in a separate building with explosion relief or in a separate room isolated from other areas by interior walls designed not to fail before explosion pressure is vented to a safe, outside location? OR, is the grinding equipment designed to be protected in accordance with NFPA 68 or NFPA 69?						
16.10	Have all elevator legs handling bulk raw grain been assessed based on 9.3.14.2?						
	Are there any deficient or nonconforming items identified?						
16.11	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
17.0 GRAIN AND SPRAY DRYER (NFPA 61, 9.3.17.2 - 9.3.17.5)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**
Does the facility have grain or spray dryers? If yes, complete 17.0; if no, skip to 18.0.							
17.1	Have each of the key equipment type designs been assessed based on requirements of NFPA 61, 9.3.17?						
	Are there any deficient or nonconforming items identified?						
17.2	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
18.0 HEAT TRANSFER OPERATIONS (NFPA 61, 9.3.19)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**
Does the facility have heat transfer operations? If yes, complete 18.0; if no, skip to 19.0.							
18.1	Are heat transfer devices utilizing air, steam, or vapors of heat transfer fluids provided with pressure-relief valves where necessary?						
18.2	Are relief valves on systems employing combustible heat transfer media vented to a safe, outside location?						
18.3	Are heaters and pumps for combustible heat transfer fluids located in a separate, dust-free room or building of noncombustible construction that is protected by automatic sprinklers?						
18.4	Is air for combustion taken from a clean, outside source?						
18.5	Are enclosures for heat exchangers constructed of noncombustible materials and equipped with access openings for cleaning and maintenance?						
18.6	Are heat exchangers located and arranged in a manner that does not allow combustible dust to accumulate on coils, fins, or other heated surfaces?						
18.7	Are heat exchangers interlocked to shut down the heater and fluid transfer pumps upon activation of the fire protection and/or deflagration protection systems for any areas served by this system?						
18.8	Are heating units provided with a source of combustion air ducted directly from the building exterior or from an unclassified location?						
	Are there any deficient or nonconforming items identified?						
18.9	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
19.0 VENTILATION AND VENTING (NFPA 61, 9.3.20)		**Yes**	**No**	**N/A**	**Comments**	**Action**	**Date Due**

(NFPA 61, 9.3.20)		Yes	No	N/A	Comments	Action	Date Due
19.1	Have each of the key equipment type designs been assessed based on requirements of NFPA 61, 9.3.20?						
19.2	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
20.0 MITIGATION							
Dust Control		Yes	No	N/A	Comments	Action	Date Due
20.1	Have each of the key equipment type designs been assessed based on requirements of NFPA 61, Section 9.6?						

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20.0, MITIGATION, continued							
Dust Control, continued		Yes	No	N/A	Comments	Action	Date Due
20.2	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
Explosion Prevention/Protection							
20.3	Have each of the key equipment type designs been assessed based on requirements of NFPA 61, Section 9.7?						
20.4	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
Fire Protection		Yes	No	N/A	Comments	Action	Date Due
20.5	Have each of the key equipment type designs been assessed based on requirements of NFPA 61, Section 9.8?						
20.6	Are there any deficient or nonconforming items identified?						
	If yes, was a plan written with estimated dates for bringing structure into compliance with this set of requirements?						
21.0 HUMAN FACTOR		Yes	No	N/A	Comments	Action	Date Due
21.1	Does the facility have a sanitation program that includes cleaning and equipment integrity assessment based on dust releases and accumulations?						
21.2	Are all areas shown in 2.3 rated as unclassified due to equipment design and maintenance to prevent or limit dust releases, and do they include a sanitation program that calls for frequent cleaning to ensure they meet the requirements to remain unclassified?						
21.3	Does the sanitation program include requirements of NFPA 61, Section 8.4, Housekeeping?						
21.4	Are motor control centers (MCCs) pressurized to prevent dust infiltration?						
	If not, are they arranged to limit dust infiltration, and are they combined with an effective program to keep the room and cabinets free of dust accumulations?						
21.5	Does the housekeeping program address combustible dust accumulations at the following priority areas:						
	(a) Floors of enclosed areas containing grinding equipment?						
	(b) Floor areas within 10.7 m (35 ft) of inside bucket elevators?						
	(c) Floors of enclosed areas containing dryers located inside the facility?						
	Are dust accumulations on ledges, walls, rafters, beams,						

21.6	Are dust accumulations on ledges, walls, rafters, beams, ducts, and ceiling surfaces in identified priority areas maintained below acceptable limits [i.e., 0.32 cm (⅛ in.)]?						
21.7	Is there a plant hazard awareness training program?						
	Does it include the hazards associated with dust, dust accumulation, and deflagration?						
21.8	Where are the plant programs and records of inspection and training kept?						
21.9	Is smoking allowed in your facility? If yes, where?						
21.10	Are combustible dust hazard area identification procedures in place, and are all hazardous areas identified to employees and contractors (e.g., by sign, map, or other reference)?						
21.11	Before any activity that could cause dust to be suspended in air (e.g., the use of compressed air during cleaning of ledges, walls, beams, ducts, and surfaces), does the facility require that all nonrated electrical equipment be de-energized and all other known sources of ignition be removed or controlled?						
21.12	Has a formal preventative maintenance program been established for dryers, dust collectors, flexible connectors, differential pressure gauges, bucket elevators, and any other dust handling/producing/processing equipment that specifically includes the verification of grounding and bonding?						

AGRICULTURAL AND FOOD DUST HAZARD ANALYSIS (DHA) CHECKLIST

21.0 HUMAN FACTOR, continued		Yes	No	N/A	Comments	Action	Date Due
21.13	Are all critical safety systems inspected, tested, and/or calibrated per the OEM guidelines (as required by process safety assessment and NFPA facility standard)?						
21.14	Are all bearings maintained per the manufacturers' instructions or internal predictive maintenance program, and are they kept free of combustible dust, product, and excessive lubrication?						
21.15	Is there a contractor safety training program? Does it include awareness of the plant's dust hazards, hot work program, no smoking requirements per NFPA, and other requirements?						
21.16	Is there training for operators, maintenance personnel, and contractors on how to use and repair the central vacuum system?						
21.17	Is a means of fire-fighting (to include the use of water as an extinguishing agent) covered in operator, maintenance personnel, and contractor training?						
21.18	Are portable vacuums used for cleaning up combustible dusts listed for use in Class II areas?						
21.19	If a portable vacuum is used:						
	(a) Is it a conductive system?						
	(b) Are the hoses conductive and grounded, or static-dissipative?						
	(c) Is the fan protected from dust-laden air by a filter?						
21.20	If an electric portable vacuum is used, is the motor rated for a Class II, Division 1 location?						
21.21	Is there training for operators, maintenance personnel, and contractors on how to use and repair the portable vacuum systems?						
21.22	Is the portable vacuum used only for dry particulate solids so that the filter is always in place?						
21.23	Is there training for operators, maintenance personnel, and contractors on how to use and repair the portable vacuum system (e.g., conductive tools, ensuring that the exhaust dust does not disperse and suspend layers of dust deposits)?						
21.24	Does combustible dust accumulate on the overhead ductwork so that it could support a deflagration if						

21.24	Does combustible dust accumulate on the overhead ductwork so that it could support a deflagration if dispersed?						
21.25	When a branch line is disconnected, blanked off, or otherwise modified, is the design of the entire system verified to ensure the whole system operates effectively?						
21.26	Is verifying that the ductwork is clean of combustible dusts a prerequisite to issuing hot work permits?						
21.27	Is there a hot work procedure in place before welding or cutting on ducts?						
21.28	Do maintenance and contract maintenance personnel receive training to learn that hot work produces localized heating of equipment and piping, as well as sparks, which can cause dust fires and explosions?						
21.29	Does the hot work permit reflect the intent of NFPA 51B?						
21.30	Is a new permit issued for every shift of hot work?						
21.31	Is equipment undergoing hot work always taken out of service and kept inoperable until the work is complete and equipment cooled?						
21.32	Have all hazards been cleared internally and externally from the equipment before starting hot work?						
21.33	Are all ignitible materials within 11 m (35 ft) removed or protected?						
21.34	Are all combustible dust layers within 11 m (35 ft) removed by cleaning before starting hot work?						
21.35	Has the area been checked for ignitible vapors and gasses?						
21.36	Are floors and structures in the work area covered with fire-proofed material or adequately wetted with water?						
21.37	Are welding shields present, if required, to protect passersby?						

AGRICULTURAL AND FOOD DUST HAZARD ANALYSIS (DHA) CHECKLIST

21.0 HUMAN FACTOR, continued		Yes	No	NA	Comments	Action	Date Due
21.38	If sparks could travel to an adjacent room through cracks or openings, have combustible materials all been moved or protected?						
21.39	Will any fire protection or detection systems be disabled as a result of this hot work?						
	If yes, is an active fire watch available?						
21.40	Is a trained fire watch present during the hot work and for 60 minutes after the hot work is completed?						
21.41	Are regular inspections of the work area made to ensure that no smoldering fires develop, including a final inspection performed prior to closing the area for the day or weekend?						
21.42	Have people responsible for the hot work operations received documented training to (1) inspect the proposed work area to determine that the conditions of the permit system have been met, (2) designate additional precautions as deemed necessary, and (3) sign the permit to authorize the work to begin?						
21.43	Is combustible dust training provided annually to staff involved in facility design and operation, including plant engineering and maintenance?						
21.44	Are contractors informed of all known/potential hazards related to their work as well as site safety rules to reduce combustible dust fire and explosion hazards, including, but not limited to, emergency action plans, hot work permits, avoiding potential ignition sources, grounding requirements, cleaning out of combustible material before commencing work, and prohibition of smoking in hazardous areas?						