MEMORANDUM

(Amendment 61-10, Log #1041)

TO: Technical Committee on Agricultural Dusts

FROM: Martha Curtis, Staff Liaison

DATE: June 18, 2012


At the June 2012 Technical Session, held June 13-14, 2012, NFPA 61 was amended by the acceptance of the following:

Amendment: 61-10

In accordance with Section 4.7 of the Regulations Governing Committee Projects, the committee must now be balloted on the Association meeting action. Should the ballot not pass, the wording of that portion of the Report affected by the amendment would return to the text of the previous edition, if any. If there is no previous edition text, the text is simply deleted.

Please review this item, complete the attached ballot, and return it to NFPA as soon as possible, but no later than Thursday, June 28, 2012. If you disagree or abstain on an amendment please indicate your reason(s) for doing so.

The transcripts from the Annual 2012 Association Technical Meeting (June 13 and June 14) will be available within two weeks at: http://www.nfpa.org/itemDetail.asp?categoryID=1424&itemID=33784

Note: Please remember that the return of ballots and attendance at Committee Meetings is required in accordance with Section 3.1.3.1 of the Regulations Governing Committee Projects.
5.1.3.2 The source of all calculation methods and models shall be documented with their limits of applicability.

5.1.4.1 Performance-based designs and documentation shall be updated and subject to re-approval if any of the assumptions on which the original design was based are changed.

5.1.5.1 Data sources shall be identified and documented for each input data requirement that must be met using a source other than a design fire scenario, an assumption, or a building design specification.

5.1.5.2 The degree of conservatism reflected in such data shall be specified, and a justification for these sources shall be provided.

5.2 Performance Criteria.

A system and facility design shall be deemed to meet the objectives specified in Section 4.5 if its performance meets the criteria in 5.2.1 through 5.2.5.

5.2.1 Occupant Life Safety.

5.2.1.1 The life safety objectives of 4.5.1 with respect to a fire hazard shall be achieved if either of the following criteria is met:

1. Ignition has been prevented.
2. Under all fire scenarios, no person, other than those in the immediate proximity of the ignition, is exposed to untenable conditions due to the fire, and no critical structural element of the building is damaged to the extent that it can no longer support its design load during the period of time necessary to effect complete evacuation of the occupants.

5.2.1.2 The life safety objectives of 4.5.1 with respect to an explosion hazard, shall be achieved if either of the following criteria is met:

1. Ignition has been prevented.
2. Under all explosion scenarios, no person, other than those in the immediate proximity of the ignition, is exposed to untenable conditions, including missile impact or overpressure, due to the occurrence of an explosion, and no critical structural element of the building is damaged to the extent that it can no longer support its design load during the period of time necessary to effect complete evacuation of the occupants.

5.2.2 Structural Integrity. The structural integrity objective of 4.5.2 with respect to fire and explosion shall be achieved when no critical structural element of the building is damaged to the extent that it can no longer support its design load under all fire and explosion scenarios.

5.2.3 Mission Continuity. The mission continuity objectives of 4.5.3 shall be achieved when damage to equipment and the facility has been limited to a level of damage acceptable to the owner/operator.

5.2.4 Mitigation of Fire Spread and Explosions. When limitation of fire spread is to be achieved, all of the following criteria shall be demonstrated:

1. Adjacent combustibles shall not attain their ignition temperature.
2. Building design and housekeeping shall prevent combustibles from accumulating exterior to the enclosed process system to a concentration that is capable of supporting a propagation.
3. Particulate processing systems shall prevent fire or explosion from propagating from one process system to an adjacent process system or to the building interior.

5.2.5 Effects of Explosions. Where the prevention of damage due to explosion is to be achieved, deflagrations shall not produce any of the following conditions:

1. Internal pressures in the room or equipment sufficient to threaten its structural integrity.
2. Extension of the flame front outside the compartment or equipment of origin except where intentionally vented to a safe location.
3. Rupture of the compartment or equipment of origin and the ejection of fragments that can constitute missile hazards.

5.3 Design Scenarios.

5.3.1 Fire Scenarios.

5.3.1.1 Each fuel object in the compartment shall be considered for inclusion as a fire scenario.

5.3.1.2 The fuel object that produces the most rapidly developing fire during startup, normal operating conditions, or shutdown shall be included as a fire scenario.

5.3.1.3 The fuel object that produces the most rapidly developing fire under conditions of a production upset or single equipment failure shall be included as a fire scenario.

5.3.1.4 The fuel object that produces the greatest total heat release during startup, normal operating conditions, or shutdown shall be included as a fire scenario.

5.3.1.5 The fuel object that produces the greatest total heat release under conditions of a production upset or single equipment failure shall be included as an explosion scenario.

5.3.1.6 The fuel object that can produce a deep-seated fire during startup, normal operating conditions, or shutdown shall be included as a fire scenario.

5.3.1.7 The fuel object that can produce a deep-seated fire under conditions of a production upset or single equipment failure shall be included as a fire scenario.

5.3.2 Explosion Scenarios.

5.3.2.1 Each duct, enclosed conveyor, silo, bunker, air-material separator cyclone, dust collector, or other vessel containing a combustible dust in sufficient quantity or conditions to support the propagation of a flame front during startup, normal operating conditions, or shutdown shall be included as an explosion scenario.

5.3.2.2 Each duct, enclosed conveyor, silo, bunker, air-material separator cyclone, dust collector, or other vessel containing a combustible dust in sufficient quantity or conditions to support the propagation of a flame front under conditions of production upset or single equipment failure shall be included as an explosion scenario.

5.3.2.3 Each building or building compartment containing a combustible dust in sufficient quantity or conditions to support the propagation of a flame front during startup, normal operating conditions, or shutdown shall be included as an explosion scenario.

5.3.2.4 Each building or building compartment containing a combustible dust in sufficient quantity or conditions to support the propagation of a flame front under conditions of production upset or single equipment failure shall be included as an explosion scenario.

5.4 Evaluation of Proposed Design.

5.4.1 General. A proposed design’s performance shall be assessed relative to each performance objective in Section 4.5 and each applicable scenario in Section 5.3, with the assessment conducted through the use of appropriate calculation methods acceptable to the authority having jurisdiction.

5.4.2 The design professional shall establish numerical performance criteria for each of the objectives in Section 4.5.

5.4.3 The design professional shall use the assessment methods to demonstrate that the proposed design will achieve the goals and objectives, as measured by the performance criteria in light of the safety margins and uncertainty analysis, for each scenario, given the assumptions.

5.4.1.3.1 Chapter 5 of NFPA 101, Life Safety Code, provides a more complete description of the performance-based design process and requirements. In addition, the SFPE Engineering Guide to Performance-Based Fire Protection Analysis and Design of Buildings outlines a process for evaluating, developing, and documenting performance-based designs.

5.4.1.4 Relevant aspects that could require a re-evaluation include, but are not limited to, changes to the following:

1. Information about the hazardous characteristics of the materials
2. Information about the performance capabilities of protective systems
3. Heretofore unrecognized hazards
4. Intentional changes to process materials, technology, equipment, procedures, and facilities are controlled by Section 4.3.

5.4.2.5 Deflagration vent operation does not constitute rupture of the equipment.

5.5 The process hazard analysis conducted according to the requirement in Section 5.2 might be useful in identifying the scenarios for Section 5.

The fire and explosion scenarios defined in Section 5.3 assume the presence of an ignition source, even those scenarios limited by administrative controls (such as a hot work permit program). It is the responsibility of the design professional to document any scenario that has been excluded on the basis of the absence of an ignition source.

A.5.4.1 The SFPE Engineering Guide to Performance-Based Fire Protection Analysis and Design of Buildings outlines a process for evaluating whether trial designs meet the performance criteria.

A.5.5.3 Substantiation: The current version of the document is too prescriptive and does not encourage utilization of state of the art fire/explosion protection knowledge to develop cost effective applications.

Committee Meeting Action: Accept in Principle

See Committee Action and Statement on Proposal 61-22 (Log #44).

Committee Statement: The Committee believes that the proposed Annex materials for Section 1.5 in Proposal 61-22 (Log #44) makes it clear that performance-based design options can be achieved through the use of NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids.
Number Eligible to Vote: 28  
Ballot Results: Affirmative: 26 Negative: 1  
Ballot Not Returned: 1 Schoeff, R.

Explanation of Negative:  
SUTTON, J.: See my Explanation of Negative on Proposal 61-22 (Log #44).

Comment on Affirmative:  
YOUNT, J.: Agree with Committee Meeting Action and/or Committee  
Statement.

Related Proposal 61-22 to Proposal 61-23

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61-22 Log #44  
Final Action: Accept in Principle  
(Chapter 5)

Submitter: Jack E. Osborn, Airdusco, Inc.  
Recommendation: Total “new” Chapter 5. The existing Chapter 5 would become Chapter 6, etc. Intent is to incorporate all of Chapter 5 from NFPA 654 (2006). The existing Chapter 5 and subsequent chapters after would require renumbering.

Substantiation: (1) There is no provision for a Performance Based Design Option in the current NFPA 61 document. Such an option is a most important option to provide for the users of the NFPA 61 document. If offers a valid alternative that may be the only viable option for some situations.

Substantiation: The added items are included as major portions of NFPA 654 and NFPA 664 (although stated somewhat differently). Not having this important option in NFPA 61 is a major deficiency that must be corrected.

A common complaint by users of the current NFPA 61 document is the lack of information and explanations of the referenced devices in the text of the document. The user is required to go to other publications to obtain information that should be contained in the NFPA 61 document.

Committee Meeting Action: Accept in Principle
Add an asterisk and Annex text for Section 1.5* Equivalency to read:  
A.1.5 This standard permits the use of performance-based design options. Guidelines on performance-based design options for combustible dust hazards can be found in NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids.

Committee Statement: The Committee agreed with the submitter’s substantiation and added Annex material for Section 1.5 that clarifies that performance-based design options are achieved through the use of the equivalency clause and to make it clear that NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, can be used to develop performance-based design options for this standard.

Number Eligible to Vote: 28  
Ballot Results: Affirmative: 26 Negative: 1  
Ballot Not Returned: 1 Schoeff, R.

Explanation of Negative:  
SUTTON, J.: While I agree that the Equivalency paragraph (1.5) should permit the user to use Performance Based Design, adding a new chapter addresses the issue much better by providing guidance to the user on how to use Performance Based Design and puts the information at the user’s finger tips instead of going to another document.

Comment on Affirmative:  
YOUNT, J.: Agree with Committee Meeting Action and/or Committee  
Statement.
Amendment: Accept Proposal 61-23

☐ Agree

If you agree with this amendment, the result will be to add a new Chapter 5, Performance-Based Design Option.

See the attached Proposal 61-23 that contains the proposed text of new Chapter 5.

☐ Do Not Agree*

If you do not agree with this amendment, the recommendation is to return to previous edition text, if any. Since this material was not in the previous edition, the proposed new chapter is deleted.

☐ Abstain*

*Please give reasons for voting “Do Not Agree” or “Abstain”:

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Please return as soon as possible, but no later than Thursday, June 28, 2012 to:

Joanne Goyette, Administrator, Technical Projects
National Fire Protection Association
1 Batterymarch Park, Quincy, MA 02169  FAX: 617-984-7110

Signature: ________________________________

Name - Please Print: ________________________________

Date: ________________________________