



IDAHO DEPARTMENT OF
HEALTH & WELFARE

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INFORMATIONAL LETTER #2004-7

DATE: June 22, 2004

TO: ALL IDAHO HOSPITALS AND NURSING FACILITIES

FROM: DEBBY RANSOM, R.N., R.H.I.T., Chief
Bureau of Facility Standards

SUBJECT: **TENTATIVE INTERIM AMENDMENT (TIA)**
ALCOHOL-BASED HAND SANITIZERS
CHAPTERS 18 AND 19, LIFE SAFETY CODE, 2000 AND 2003 EDITIONS

On April 15, 2003 the Standards Council of the National Fire Protection Association issued an amendment to Chapter 18 and 19 of both the 2003 and 2000 Editions of the Life Safety Code. The amendment specifically addresses the placement of alcohol-based hand sanitizers in new and existing health care occupancies.

Although it is a tentative interim amendment (meaning it has not gone through the entire standards making process), it is to be considered effective and part of the Code between editions and will automatically become a proposal for the next edition.

The Centers for Medicare and Medicaid (i.e., CMS) have not provided the State Agency with official notification. The amendment, as issued by NFPA, is however considered part of the Life Safety Code, 2000 Edition.

A copy of the TIA is enclosed.

Should you have any questions, please contact Roger W. Gehrke, Supervisor, Facility Fire Safety & Construction Section of the Bureau of Facility Standards.

DEBBY RANSOM, R.N., R.H.I.T., Chief
Bureau of Facility Standards

DR/nah
Enclosure

cc: Idaho Hospital Association
Idaho Health Care Association

SC #04-4-17

D#04-07



Casey C. Grant, P.E.
Secretary, Standards Council

28 April 2004

To: Interested Parties

Subject:

Standards Council Decision (Final):	D#04-07
Standards Council Agenda Item:	SC#04-4-17
Date of Decision*:	15 April 2004
TIA No. 787: NFPA 101, <i>Life Safety Code</i> ®	

Dear Interested Parties:

At its meeting of 15 April 2004, the Standards Council considered appeals on the above referenced matter.

Attached is the final decision of the Standards Council on this matter.

Sincerely,

A handwritten signature in cursive script that reads "Casey C. Grant".

Casey C. Grant, P.E.
Secretary, NFPA Standards Council

c: D. Berry, M. Brodoff, R. Coté, L. Nisbet, R. Solomon, L. Winnett
Members, ICC on Safety to Life (SAF-AAC)
Members, IC on Health Care Occupancies (SAF-HEA)
Members, NFPA Standards Council
Individuals Providing Appeal Commentary

*NOTE: Participants in NFPA's codes and standards making process should know that limited review of this decision may be sought from the NFPA Board of Directors. For the rules describing the available review and the method for petitioning the Board for review, please consult section 1-7 of the NFPA Regulations Governing Committee Projects and the NFPA Regulations Governing Petitions to the Board of Directors from Decisions of the Standards Council. Notice of the intent to file such a petition must be submitted to the Clerk of the Board of Directors within 15 calendar days of the Date of Decision noted in the subject line of this letter.



Standards Council Decision (Final):	D#04-07
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TIA No. 787: NFPA 101, <i>Life Safety Code</i> ®	

At its meeting of 15 April 2004, the Standards Council considered an appeal regarding the issuance of proposed Tentative Interim Amendment (TIA) No. 787 on the 2003 edition of NFPA 101, *Life Safety Code*®. The proposed TIA seeks to add new text to Chapters 18 and 19 of NFPA 101 to address the placement of alcohol-based hand sanitizers in new and existing health care occupancies.

Proposed TIA No. 787 was submitted by the Technical Committee (TC) on Health Care Occupancies, and was generated by the TC at their recent February 2004 meeting in response to an appeal on an earlier version of this TIA addressed in January 2004 by the Standards Council (see SC# 04-1-12; D# 04-02). At that time, the Council denied issuance of the initial version of the TIA (No. 769) but directed that the "... TC work with the appellants to review the outstanding technical concerns, and consider the necessary steps to resolve these concerns including, if appropriate, the generation of a revised TIA."

The result of this effort is TIA No. 787 currently before the Council. This TIA was balloted through the Technical Correlating Committee (TCC) on Safety to Life and the TC on Health Care Occupancies in accordance with the Regulations Governing Committee Projects (Regs.). The TIA ballot passed the TC and TCC on both technical merit and emergency nature and no appeal opposing its issuance has been filed. The only issue before the Council, therefore, is a request that the TIA be issued on the 2000 edition as well as the current 2003 edition of NFPA 101. Generally under NFPA rules, TIA's shall apply only to the document existing at the time of issuance and, in some circumstances, to the next edition. (See Regs. at 5-8). The rules, however, give the Council flexibility to make an exception where circumstances warrant. (See Regs. at 5-10).

The Council has been informed that, as a practical matter, the health care occupancies to which the TIA is intended to apply are governed, through federal regulatory adoption, by the 2000 edition of the *Life Safety Code*®. This edition, having only been recently adopted by federal regulators, is not likely to be superseded for several years. The appellants further indicate that federal incorporation of TIA No. 787 will be greatly facilitated if it is issued directly on that 2000 edition. Finally, they note that the *Life Safety Code*® text to which the TIA applies is essentially identical (with minor editorial adjustment) in both editions, and the TIA, therefore, can readily be applied to both the current and previous editions. Given these circumstances, along with the magnitude of the infection control problem that this TIA will address, the Council has determined, in this instance, to grant the request of the appellants. Accordingly, after reviewing all the information available to it, the Council has voted to issue TIA 787 on both the 2003 edition and the 2000 edition of NFPA 101.



Tentative Interim Amendment

NFPA 101[®]

Life Safety Code[®]

2000 Edition

Reference: Chapters 18 and 19
TIA 00-1 (101)
(SC-04-4-17/Log 787A)

Pursuant to Section 5 of the NFPA Regulations Governing Committee Projects, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 101[®], *Life Safety Code*[®], 2000 edition. The TIA was processed by the Safety to Life Committee, and was issued by the Standards Council on April 15, 2004, with an effective date of May 5, 2004.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a proposal of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. Add new text to Chapter 18 for new health care occupancies as follows:

18.3.2.7* Alcohol-based Hand-rub Solutions. Alcohol-based hand-rub dispensers shall be protected in accordance with 8.4.3 unless all of the following conditions are met:

(1) Where dispensers are installed in a corridor, the corridor shall have a minimum width of (1.8 m) 6 ft

(2) The maximum individual dispenser fluid capacity shall be:

(a) (1.2 L) 0.3 gal for dispensers in rooms, corridors, and areas open to corridors

(b) (2.0 L) 0.5 gal for dispensers in suites of rooms

(3) The dispensers shall have a minimum horizontal spacing of (1.2 m) 4 ft from each other.

(4) Not more than an aggregate (37.8 L) 10 gal of alcohol-based hand-rub solution shall be in use in a single smoke compartment outside of a storage cabinet.

(5) Storage of quantities greater than (18.9 L) 5 gal in a single smoke compartment shall meet the requirements of NFPA 30, *Flammable and Combustible Liquids Code*.

(6) The dispensers shall not be installed over or directly adjacent to an ignition source.

(7) In locations with carpeted floor coverings, dispensers installed directly over carpeted surfaces shall be permitted only in sprinklered smoke compartments.

18.3.2.8 ~~18.3.2.7~~ Buildings housing health care occupancies, as indicated in 18.1.1.1 2, that have rooftop heliports shall be protected in accordance with NFPA 418, *Standard for Heliports*.

18.2.3.3* Aisles, corridors, and ramps required for exit access in a hospital or nursing home shall be not less than (2.4 m) 8 ft in clear and unobstructed width. Where ramps are used as exits, see 18.2.2.6.

Exception No. 1: * Aisles, corridors and ramps in adjunct areas not intended for the housing, treatment, or use of inpatients shall be not less than (112 cm) 44 in in clear and unobstructed width.

Exception No. 2: Where minimum corridor width is 6 ft (1.8 m), projections of maximum (15.2 cm) 6 in. from the corridor wall, above the handrail height, shall be permitted for the installation of hand-rub dispensing units in accordance with 18.3.2.7.

Exception No. 3: * ~~2~~* Exit access within a room or suite of rooms complying with the requirements of 18.2.5

18.2.3.4 Aisles, corridors, and ramps required for exit access in a limited care facility or hospital for psychiatric care shall be not less than (1.8 m) 6 ft in clear and unobstructed width. Where ramps are used as exits, see 18.2.2.6.

Exception No. 1: * Aisles, corridors, and ramps in adjunct areas not intended for the housing, treatment, or use of inpatients shall be not less than (112 cm) 44 in. clear and unobstructed width.

Exception No. 2: Where minimum corridor width is (1.8 m), 6 ft projections of maximum (15.2 cm) 6 in. from the corridor wall, above the handrail height, shall be permitted for the installation of hand-rub dispensing units in accordance with 18.3.2.7.

Exception No. 3: * 2-* Exit access within a room or suite of rooms complying with the requirements of 18.2.5.

A.18.3.2.7 The Centers for Disease Control and Prevention on October 25, 2002, issued the *Guidelines for Hand Hygiene in Health-Care Settings* [MMWR 2002; 51 (no. RR-16)], which highly recommends the placement of alcohol-based hand-rub solutions in convenient locations of patient care areas of health care organizations. Clinical studies indicate that the frequency of handwashing or antiseptic handwashing by personnel is affected by the accessibility of hand-hygiene facilities. By permitting the installation of hand-rub dispensers immediately outside the patient/residence bedroom or within suites of rooms, the overall efficacy of staff use has been proven to increase by over 20 percent.

According to the CDC, more than 88,000 patient deaths per year are attributed to hospital-acquired infections, and one of the principal methodologies for reducing this statistic is by the expanded use of alcohol-based hand-rub solutions. These products have been found to be more effective for standard handwashing or hand antisepsis by health care workers than soap or antimicrobial soaps.

To address the fire hazard of introducing additional alcohol-based materials, a fire-modeling project was initiated to study the overall effects of placing dispensers in corridors and suites of rooms. This modeling was accomplished using the Fire Dynamics Simulator (FDS) Version 3.1, published by the National Institute of Standards and Technology (NIST). Using the results of the FDS model the potential hazards were evaluated by reviewing the data for tenability of the space, ignition of adjacent fuel loads/combustibles, and sprinkler activation.

The tenability value for this report was chosen to be conservative. The fire modeling does clearly show that up to (1.2-L) 0.3-gal container size in a corridor and up to a (2-L) 0.5-gal container size in a suite location to be acceptable for either Ethyl; or Isopropyl Alcohol based products. Except for a scenario that modeled the (1.2-L) 0.3-gal Isopropyl Alcohol container in a 1.8-m) 6-ft (wide corridor with all doors closed, all of the results with realistic conditions showed no issues. For that one scenario, the visibility did drop below the stated threshold, but since visibility is not an immediate health concern and it did not occur until the very end of the fire's burn time (final 15 seconds), only to improve dramatically to twice the allowable value, we feel that this is still an acceptable result. The scenario with (1.8-m) 6-ft corridors and all doors closed, which is a very extreme case compared to actual conditions, does show some concerns compared to our tenability criteria. The results showed that the corridor remained below the visibility and CO thresholds established. The temperature in this scenario did drop below the tenability threshold (which has a factor of safety of 10) but not significantly. This scenario helps to prove that the hazard is acceptable.

The results clearly indicate that the (2-L) 0.5-gal container size to be unacceptable in a corridor location. In addition, the results also indicate the scenario with a carpeted floor is a concern due to visibility problems. The scenario showed that the visibility in the corridor dropped slightly below our assigned threshold. The carpet scenario is based on assumptions (soot and CO yields) that are not validated via any test data or other available data sources. The yields used are based on engineering judgment and need further study to make a firm recommendation.

Visibility, unlike other tenability areas (for example, temperature, toxicity), is based on a number of factors, has limited real life test data, and is very subjective. The resources available have a wide range of values that could be considered acceptable based on various factors, such as type of smoke (irritating vs. non-irritating), travel distances, and familiarity with escape routes, etc.

The results showed that none of the fuel targets put into the models would ignite based on the design fires chosen. This indicates that the proposed spacing to be reasonable to prevent additional fire hazards. Sprinkler activation was not predicted for most of the scenarios modeled. When the sprinklers actuated it was most often after the conditions had exceeded the tenability thresholds and typically with the larger (2-L) 0.5-gal spills. Due to the lack of sprinkler activation, it is important to address the hazard from products of combustion such as smoke or CO more than the hazards from heat or the actual fire.

2. Add new text to Chapter 19 for existing health care occupancies as follows:

19.3.2.7* Alcohol-based Hand-rub Solutions. Alcohol-based hand-rub dispensers shall be protected in accordance with 8.4.3 unless all of the following conditions are met:

(1) Where dispensers are installed in a corridor, the corridor shall have a minimum width of (1.8 m) 6 ft

(2) The maximum individual dispenser fluid capacity shall be:

(a) (1.2 L) 0.3 gal for dispensers in rooms, corridors, and areas open to corridors

(b) (2.0 L) 0.5 gal for dispensers in suites of rooms

(3) The dispensers shall have a minimum horizontal spacing of (1.2 m) 4 ft from each other.

(4) Not more than an aggregate (37.8 L) 10 gal of alcohol-based hand-rub solution shall be in use in a single smoke compartment outside of a storage cabinet.

(5) Storage of quantities greater than (18.9 L) 5 gal in a single smoke compartment shall meet the requirements of NFPA 30, *Flammable and Combustible Liquids Code*.

(6) The dispensers shall not be installed over or directly adjacent to an ignition source.

(7) In locations with carpeted floor coverings, dispensers installed directly over carpeted surfaces shall be permitted only in sprinklered smoke compartments.

19.2.3.3* Any required aisle, corridor, or ramp shall be not less than (1.2 m) 4 ft in clear width where serving as means of egress from patient sleeping rooms. The aisle, corridor, or ramp shall be arranged to avoid any obstructions to the convenient removal of nonambulatory persons carried on stretchers or on mattresses serving as stretchers.

Exception No. 1: Aisles, corridors, and ramps in adjunct areas not intended for the housing, treatment, or use of inpatients shall be not less than (112 cm) 44 in in clear and unobstructed width.

Exception No. 2: Where minimum corridor width is (1.8 m), 6 ft projections of maximum (15.2 cm) 6 in. from the corridor wall, above the handrail height, shall be permitted for the installation of hand-rub dispensing units in accordance with 19.3.2.7.

Exception No. 3: 2- Exit access within a room or suite of rooms complying with the requirements of 19.2.5

A.19.3.2.7 The Centers for Disease Control and Prevention on October 25, 2002, issued the *Guidelines for Hand Hygiene in Health-Care Settings* [MMWR 2002; 51 (no. RR-16)], which highly recommends the placement of alcohol-based hand-rub solutions in convenient locations of patient care areas of health care organizations. Clinical studies indicate that the frequency of handwashing or antiseptic handwashing by personnel is affected by the accessibility of hand-hygiene facilities. By permitting the installation of hand-rub dispensers immediately outside the patient/residence bedroom or within suites of room the overall efficacy of staff use has been proven to increase by over 20 percent.

According to the CDC, more than 88,000 patient deaths per year are attributed to hospital-acquired infections, and one of the principal methodologies for reducing this statistics is by the expanded use of alcohol-based hand-rub solutions. These products have been found to be more effective for standard handwashing or hand antisepsis by health care workers than soap or antimicrobial soaps.

To address the fire hazard of introducing additional alcohol-based materials, a fire-modeling project was initiated to study the overall effects of placing dispensers in corridors and suites of rooms. This modeling was accomplished using the Fire Dynamics Simulator (FDS) Version 3.1 published by the National Institute of Standards and Technology (NIST). Using the results of the FDS model, the potential hazards were evaluated by reviewing the data for tenability of the space, ignition of adjacent fuel loads/combustibles, and sprinkler activation.

The tenability value for this report was chosen to be conservative. The fire modeling does clearly show that up to (1.2-L) 0.3-gal container size in a corridor and up to a (2-L) 0.5-gal container size in a suite location to be acceptable for either Ethyl- or Isopropyl Alcohol based products. Except for a scenario that modeled the (1.2-L) 0.3-gal Isopropyl Alcohol container in a (1.8-m) 6-ft wide corridor with all doors closed, all of the results with realistic conditions showed no issues. For that one scenario, the visibility did drop below the stated threshold but since visibility is not an immediate health concern and it did not occur until the very end of the fire's burn time (final 15 seconds), only to improve dramatically to twice the allowable value, we feel that this is still an acceptable result. The scenario with (1.8-m) 6-ft corridors and all doors closed, which is a very extreme case compared to actual conditions, does show some concerns compared to our tenability criteria. The results showed that the corridor remained below the visibility and CO thresholds established. The temperature in this scenario did drop below the tenability threshold (which has a factor of safety of 10) but not significantly. This scenario helps to prove that the hazard is acceptable.

The results clearly indicate that the (2-L) 0.5-gal container size to be unacceptable in a corridor location. In addition, the results also indicate the scenario with a carpeted floor is a concern due to visibility problems. The scenario showed that the visibility in the corridor dropped slightly below our assigned threshold. The carpet scenario is based on assumptions (soot and CO yields) that are not validated via any test data or other available data sources. The yields used are based on engineering judgment and need further study to make a firm recommendation.

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SC #04-4-17
D#04-07



Casey C. Grant, P.E.
Secretary, Standards Council

28 April 2004

To: Interested Parties

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Tentative Interim Amendment

NFPA 101[®]
Life Safety Code[®]
2000 Edition

Reference: Chapters 18 and 19
TIA 00-1 (101)
(SC-04-4-17/Log 787A)

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*Exception No. 1:** Aisles, corridors, and ramps in adjunct areas not intended for the housing, treatment, or use of inpatients shall be not less than (112 cm 44 in.) in clear and unobstructed width.

Exception No. 2: Where minimum corridor width is 6 ft (1.8 m), projections of maximum (15.2 cm) 6 in. from the corridor wall, above the handrail height, shall be permitted for the installation of hand-rub dispensing units in accordance with 18.3.2.7.

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The results clearly indicate that the (2-L) 0.5-gal container size to be unacceptable in a corridor location. In addition, the results also indicate the scenario with a carpeted floor is a concern due to visibility problems. The scenario showed that the visibility in the corridor dropped slightly below our assigned threshold. The carpet scenario is based on assumptions (soot and CO yields) that are not validated via any test data or other available data sources. The yields used are based on engineering judgment and need further study to make a firm recommendation.

Visibility, unlike other tenability areas (for example, temperature, toxicity), is based on a number of factors, has limited real life test data, and is very subjective. The resources available have a wide range of values that could be considered acceptable based on various factors, such as type of smoke (irritating vs. non-irritating), travel distances, and familiarity with escape routes, etc.

The results showed that none of the fuel targets put into the models would ignite based on the design fires chosen. This indicates that the proposed spacing to be reasonable to prevent additional fire hazards. Sprinkler activation was not predicted for most of the scenarios modeled. When the sprinklers actuated it was most often after the conditions had exceeded the tenability thresholds and typically with the larger (2-L) 0.5-gal spills. Due to the lack of sprinkler activation, it is important to address the hazard from products of combustion such as smoke or CO more than the hazards from heat or the actual fire.

2. Add new text to Chapter 19 for existing health care occupancies as follows:

19.3.2.7* Alcohol-based Hand-rub Solutions. Alcohol-based hand-rub dispensers shall be protected in accordance with 8.4.3 unless all of the following conditions are met:

(1) Where dispensers are installed in a corridor, the corridor shall have a minimum width of (1.8 m) 6 ft

(2) The maximum individual dispenser fluid capacity shall be:

(a) (1.2 L) 0.3 gal for dispensers in rooms, corridors, and areas open to corridors

(b) (2.0 L) 0.5 gal for dispensers in suites of rooms

(3) The dispensers shall have a minimum horizontal spacing of (1.2 m) 4 ft from each other.

(4) Not more than an aggregate (37.8 L) 10 gal of alcohol-based hand-rub solution shall be in use in a single smoke compartment outside of a storage cabinet.

(5) Storage of quantities greater than (18.9 L) 5 gal in a single smoke compartment shall meet the requirements of NFPA 30, *Flammable and Combustible Liquids Code*.

(6) The dispensers shall not be installed over or directly adjacent to an ignition source.

(7) In locations with carpeted floor coverings, dispensers installed directly over carpeted surfaces shall be permitted only in sprinklered smoke compartments.

19.2.3.3* Any required aisle, corridor, or ramp shall be not less than (1.2 m) 4 ft in clear width where serving as means of egress from patient sleeping rooms. The aisle, corridor, or ramp shall be arranged to avoid any obstructions to the convenient removal of nonambulatory persons carried on stretchers or on mattresses serving as stretchers.

Exception No. 1: Aisles, corridors, and ramps in adjunct areas not intended for the housing, treatment, or use of inpatients shall be not less than (112 cm) 44 in. in clear and unobstructed width.

Exception No. 2: Where minimum corridor width is (1.8 m), 6 ft projections of maximum (15.2 cm) 6 in. from the corridor wall, above the handrail height, shall be permitted for the installation of hand-rub dispensing units in accordance with 19.3.2.7.

Exception No. 3: 2- Exit access within a room or suite of rooms complying with the requirements of 19.2.5.

A-19.3.2.7 The Centers for Disease Control and Prevention on October 25, 2002, issued the *Guidelines for Hand Hygiene in Health-Care Settings* [MMWR 2002; 51 (no. RR-16)], which highly recommends the placement of alcohol-based hand-rub solutions in convenient locations of patient care areas of health care organizations. Clinical studies indicate that the frequency of handwashing or antiseptic handwashing by personnel is affected by the accessibility of hand-hygiene facilities. By permitting the installation of hand-rub dispensers immediately outside the patient/residence bedroom or within suites of room the overall efficacy of staff use has been proven to increase by over 20 percent.

According to the CDC, more than 88,000 patient deaths per year are attributed to hospital-acquired infections, and one of the principal methodologies for reducing this statistics is by the expanded use of alcohol-based hand-rub solutions. These products have been found to be more effective for standard handwashing or hand antisepsis by health care workers than soap or antimicrobial soaps.

To address the fire hazard of introducing additional alcohol-based materials, a fire-modeling project was initiated to study the overall effects of placing dispensers in corridors and suites of rooms. This modeling was accomplished using the Fire Dynamics Simulator (FDS) Version 3.1 published by the National Institute of Standards and Technology (NIST). Using the results of the FDS model, the potential hazards were evaluated by reviewing the data for tenability of the space, ignition of adjacent fuel loads/combustibles, and sprinkler activation.

The tenability value for this report was chosen to be conservative. The fire modeling does clearly show that up to (1.2-L) 0.3-gal container size in a corridor and up to a (2-L) 0.5-gal container size in a suite location to be acceptable for either Ethyl- or Isopropyl Alcohol based products. Except for a scenario that modeled the (1.2-L) 0.3-gal Isopropyl Alcohol container in a (1.8-m) 6-ft wide corridor with all doors closed, all of the results with realistic conditions showed no issues. For that one scenario, the visibility did drop below the stated threshold but since visibility is not an immediate health concern and it did not occur until the very end of the fire's burn time (final 15 seconds), only to improve dramatically to twice the allowable value, we feel that this is still an acceptable result. The scenario with (1.8-m) 6-ft corridors and all doors closed, which is a very extreme case compared to actual conditions, does show some concerns compared to our tenability criteria. The results showed that the corridor remained below the visibility and CO thresholds established. The temperature in this scenario did drop below the tenability threshold (which has a factor of safety of 10) but not significantly. This scenario helps to prove that the hazard is acceptable.

The results clearly indicate that the (2-L) 0.5-gal container size to be unacceptable in a corridor location. In addition, the results also indicate the scenario with a carpeted floor is a concern due to visibility problems. The scenario showed that the visibility in the corridor dropped slightly below our assigned threshold. The carpet scenario is based on assumptions (soot and CO yields) that are not validated via any test data or other available data sources. The yields used are based on engineering judgment and need further study to make a firm recommendation.

Visibility, unlike other tenability areas (for example, temperature, toxicity), is based on a number of factors, has limited real life test data, and is very subjective. The resources available have a wide range of values that could be considered acceptable based on various factors, such as type of smoke (irritating vs. non-irritating), travel distances, and familiarity with escape routes.

The results showed that none of the fuel targets put into the models would ignite based on the design fires chosen. This indicates the proposed spacing to be reasonable to prevent additional fire hazard. Sprinkler activation was not predicted for most of the scenarios modeled. When the sprinklers actuated it was most often after the conditions had exceeded the tenability thresholds and typically with the larger (2-L) 0.5-gal spills. Due to the lack of sprinkler activation, it is important to address the hazard from products of combustion such as smoke or CO more than the hazards from heat or the actual fire.