

## NFPA 1033, 2022 ed. Ups the Ante for Fire Investigators and NFPA 921, 2024 ed. Is in the Works

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### 1. Introduction<sup>1</sup>

The 2022 edition of NFPA 1033 *Standard for Professional Qualifications for Fire Investigator* is complete and will be issued soon. This FISC Bulletin Board will examine some of the most notable revisions and describe how to access the new edition. Having participated in the standards development process for the new edition and studied the final product,<sup>2</sup> we conclude that it is more closely aligned with NFPA 921 than ever before. The overall result of this stronger alignment together with other revisions to NFPA 1033 is that it sets a new, higher standard for fire investigators.

We will also update you on the status of the next edition of NFPA 921 *Guide for Fire and Explosion Investigations*. NFPA 921 has entered a new revision cycle. The NFPA is planning the next edition to be issued in 2023,<sup>3</sup> as a 2024 edition. The time to submit your proposals is now, as the new edition is open for Public Inputs, with a closing deadline of **5:00 pm EST/EDST on November 10, 2021**.

As of mid-June 2021, over 50 Public Inputs have already been submitted and the NFPA 921 TC has not even begun its submissions. Thus, it appears that it will be another productive revision cycle for NFPA 921! Anyone can submit a Public Input. It is a straightforward online process that we briefly explain. See section 8 of this article for details.

This article first addresses NFPA 1033, 2022 ed. by describing how to access it and reviewing noteworthy revisions and some of their implications. Then we move on to NFPA 921, first covering errata and a tentative interim amendment to the 2021 edition. Next, we talk about the Public Input phase of the next edition of NFPA 921. Finally, we invite you to participate in a survey by the Organization of Scientific Area Committees for Forensic Science (OSAC) that will report on the extent to which organizations are utilizing OSAC Registry standards such as NFPA 921 and NFPA 1033.

### 2. Accessing NFPA 1033, 2022 ed.

At the time of writing this column in early June 2021, the content of the 2022 edition has been settled by the NFPA Standards Development Process. However, the 2022 edition has not been issued by the NFPA Standards Council — a step expected in the summer of 2021.<sup>4</sup>

Once the 2022 edition is issued, anyone can access an electronic version of the 2022 edition on the NFPA 1033 Document Information Page.<sup>5</sup> There are two choices for online access. One is to click the "free access" link on that page and sign on to the NFPA.org website using your free NFPA account to view the complete text. While you can read the 2022 edition online, you cannot copy or print any portion of the document. Further, the "revision symbols" (*i.e.*, the shading and marks that signal revisions from the earlier edition) are not shown.

The second way to access the 2022 edition electronically is through a paid subscription to the NFPA's *National Fire Code Subscription Service* (NFCSS), available here: <https://codesonline.nfpa.org/>. Navigating the NFCSS is user-friendly and all of the NFPA Fire Codes<sup>®</sup> (including NFPA 1033 and NFPA 921) are fully searchable. They also have links to internal cross-references within each document. Sections can be copied or printed. However, like the free access version of the 2022 edition, revision symbols are absent. As a point of interest, the NFPA has decided not to publish a PDF of the 2022 edition. This decision applies not only to NFPA 1033 but also to other NFPA Fire Codes<sup>®</sup>, including NFPA 921.

NFPA is also publishing a print version of NFPA 1033, available for purchase through the NFPA Catalog at <https://catalog.nfpa.org/>.<sup>6</sup> Although print documents can be cumbersome at times, an advantage of the print version of NFPA 1033 is that it has symbols and shading to flag revisions from the 2014 edition. This is a helpful tool for tracking changes from the

earlier edition. If you buy the print version, look for a section in the front matter entitled *Revision Symbols Identifying Changes from the Previous Edition*. This section explains the new symbols that signal revisions. Abbreviations of these symbols also appear on the bottom of each page of the document.

If you want to track all of the changes between the two editions, you can study the revision history by reviewing the First Draft Report and Second Draft Report leading up to the 2022 edition. These reports will be available on the NFPA 1033 Document Information Page, “Next Edition” tab until NFPA 1033, 2022 ed. is published. The links to these reports will then move to the “Current & Prior Editions” tab.<sup>7</sup> Note that first and second drafts are presented to the public as part of the standard development process and hold no weight as authoritative text.

### 3. A Revised Annex B and New Annex C Support Training and Implementation of NFPA 1033’s JPRs

NFPA 1033 is organized around Job Performance Requirements (JPRs). Understanding and applying the JPRs are critical to utilizing NFPA 1033. To assist with this challenge are two annexes. Annex B *Explanation of the Professional Qualifications Standards and Concepts of Job Performance Requirements (JPRs)* has been extensively revised from the 2014 edition. It was updated to explain JPRs, to demonstrate how to convert JPRs into instructional objectives and to introduce other uses of JPRs. Annex B describes JPRs using NFPA’s Firefighter and Life Safety Educators as examples. It would have been more helpful if it used JPRs for fire investigators, but Annex B was revised to be consistent across all of NFPA’s professional qualification standards.

The 2022 edition also has a new Annex C *An Overview of JPRs for Fire Investigator*. To put the new annex into context, we first review the nature of JPRs and provide an example.

A JPR is defined as “a statement that describes a specific job task, lists the items necessary to complete the task, and defines measurable or observable outcomes and evaluation areas for that specific task.”<sup>8</sup> The JPRs are set forth in Chapter 4 *Fire Investigator*, sections 4.2 through 4.7. To be qualified as a fire investigator, NFPA 1033 makes it mandatory that a person satisfies all of these JPRs.

JPRs are organized around the fire investigator’s duties, which describe major job functions resulting from an analysis of tasks required by the job.<sup>9</sup> For example, section 4.2 *Scene Examination* states that it is the duty of a fire investigator to inspect “the fire scene or evidence of the scene.” To execute this duty the investigator is required to:

**4.2.2.** Conduct an exterior survey, given standard equipment and tools, so that evidence is identified and preserved, fire damage is interpreted and analyzed, hazards are identified to avoid injuries, accessibility to the property is determined, and all potential means of ingress and egress are discovered.<sup>10</sup>

For the tasks listed as part of the JPRs, NFPA 1033 also identifies the requisite knowledge and skills to perform these tasks, for example, for 4.2.2:

**4.2.2 (A) Requisite Knowledge.** The types of building construction and the effects of fire on construction materials, types of evidence commonly found in the perimeter, evidence preservation methods, the effects of fire suppression, fire behavior and spread, fire

patterns, and a basic awareness of the dangers of hazardous materials.

**4.2.2 (B) Requisite Skills.** Ability to assess fire ground and structural condition, observe the damage from and effects of the fire, and interpret fire patterns.

To assist NFPA 1033’s users in following the progression of the JPRs for the purpose of either implementing them or developing training programs based on the JPRs, a series of matrices have been added in the new Annex C. These matrices extract and list the duties and tasks from Chapter 4 without restating the requisite knowledge and skills. This serves as a form of checklist, making it easier to comprehend at a glance the full extent of the JPRs required to qualify as a fire investigator.

Technically Annex C, as all other annexes in NFPA standards, is for informational purposes only and does not form part of the requirements of NFPA 1033. However, Table C.1 that constitutes the matrices in Annex C, is composed entirely of excerpts from the body of Chapter 4, and therefore does represent mandatory requirements of NFPA 1033.

### 4. The “List of 16” has been Reorganized, Moved, and Annotated

Chapter 1 *Administration* defines the scope, purpose, and application of NFPA 1033. Chapter 1, subsection 1.3.7 in the 2014 edition contains the infamous “list of 16” topics. Subsection 1.3.8 requires the fire investigator to maintain an up-to-date basic knowledge of these topics beyond a high school level.

Eleven Public Inputs were received proposing revisions to the list of 16. One of these inputs was submitted by the OSAC Fire and Explosion Investigation Subcommittee. Relying on the OSAC Public Input and taking into account the other ten inputs, the NFPA Technical Committee on Fire Investigator Professional Qualifications (NFPA 1033 TC) made the following revisions to the list of 16 and subsections 1.3.7 and 1.3.8:

- The list of topics was moved from Chapter 1 Administration to a new subsection 4.1.7 in Chapter 4 Fire Investigator, where the JPRs are located. This placement is more logical because the topics from the list of 16 relate directly to requisite knowledge for the JPRs in Chapter 4.<sup>11</sup>
- As the list of topics has been a source of confusion for some readers of NFPA 1033, the list was reorganized into four categories and related subcategories, which effectively serve as an overview of the requisite knowledge for the JPRs in Chapter 4. Here is the new list:

(1) Fire science:

- (a) Fire chemistry
- (b) Thermodynamics
- (c) Fire dynamics
- (d) Explosion dynamics

(2) Fire investigation:

- (a) Fire analysis
- (b) Fire investigation methodology
- (c) Fire investigation technology

- (d) Evidence documentation, collection, and preservation
- (e) Failure analysis and analytical tools
- (3) Fire scene safety:
  - (a) Hazard recognition, evaluation, and basic mitigation procedures
  - (b) Hazardous materials
  - (c) Safety regulations
- (4) Building systems:
  - (a) Types of construction
  - (b) Fire protection systems
  - (c) Electricity and electrical systems
  - (d) Fuel gas systems
- The part of the requirement from subsection 1.3.8 in the 2014 edition that an investigator maintain an up-to-date current knowledge of the topics “beyond a high school level” is removed. In its place, a new paragraph 4.1.7.1 provides: “The fire investigator shall remain current in the subjects listed as ‘requisite knowledge’ for the JPRs and as summarized in 4.1.7.”
- A new paragraph 4.1.7.2 now requires investigators to complete a minimum amount of documented continuing education every five years.
- A new Annex D provides specific examples of concepts and terms for each topic listed in 4.1.7. This serves as a tool to evaluate the investigator’s requisite knowledge as required by NFPA 1033.

The new Annex D is a useful tool for understanding the extent of what each of the 4.1.7 topics cover. By way of example, below is a list of the concepts an investigator should know to demonstrate the requisite knowledge of just the first of the 16 subcategories listed in 4.1.7 — “Fire Chemistry.”

- (a) States of matter (gases, liquids, and solids)
- (b) Chemical reactions (fire triangle and fire tetrahedron)
- (c) Stoichiometry
- (d) Chemical composition of common combustibles
- (e) Phase changes and reactions that might require or produce energy (exothermic and endothermic processes)
- (f) Material properties (density, conductivity, specific heat, deformation, melting, vaporization, vapor pressure)
- (g) Structural properties (effect of temperatures on properties)
- (h) Combustion properties (flammable limits, minimum ignition energy, critical flux for ignition, ignition temperatures, heat of combustion, flash point of liquid, and fire point)
- (i) Fuels
- (j) Complete and incomplete combustion reaction products (combustion efficiency and role of fuel/air ratio in product composition)
- (k) The response of materials to heat (melting, dehydration, pyrolysis, charring, loss of mass, deformation, evaporation, and calcination)
- (l) Different temperature scales

Note that annex material does not form part of the requirements of 1033 and is for informational purposes. However, Annex D is useful for preparing training or

certification programs. It also has some great content for investigators who are preparing for testimony or for attorneys preparing for depositions, direct examinations, or cross-examinations.

Comparing the 2014 edition list of 16 with the 2022 edition list of 16:

- In the 2022 edition, two of the topics from the 2014 list have been elevated to topic categories (“Fire science” and “Fire investigation”), with eight of the 2014 list of 16 having been subsumed under these two headings as subcategories. There are a total of 16 subcategories.
- Two new categories (“Fire scene safety” and “Building systems”) have been added.
- Three topics have been added in the 2022 edition list: “Hazard recognition, evaluation, and basic mitigation procedures,” “Safety regulations,” and “Types of construction.”
- The topic “Thermometry,” which is “the study of the science, methodology, and practice of temperature measurement,”<sup>12</sup> was not carried forward to the new list in 4.1.7 as it is not among the JPR requisite knowledge requirements in NFPA 1033.
- “Computer fire modelling,” which is in the 2014 edition list has been removed. However, as stated in Annex D, it is incorporated under the topics “Fire investigation technology” and “Failure analysis and analytical tools.”

In our view the reorganization of the list of 16, its move to Chapter 4, and the addition of Annex D make a vast improvement in the 2022 edition. While the detail in Annex D might seem daunting at first, the annex provides a handy blueprint for the development of training or self-study programs for investigators to master these important topics. The new subsection 4.1.7 together with Annex D will also be fertile ground for attorneys looking to challenge the qualifications of fire investigators or the admissibility or weight of their opinions.

Having examined revisions in Chapter 4 dealing with the requisite knowledge topics, this article moves on to examine some other changes to this chapter. We also consider how Chapter 4 and other parts of NFPA 1033 now more closely ties NFPA 1033 to NFPA 921 than ever before.

## 5. Closer Integration between NFPA 1033 and NFPA 921 And Its Consequences

The NFPA 1033 TC has continued its ongoing efforts to align NFPA 1033 and NFPA 921. We first examine this integration and then consider its consequences for the various categories of users of these documents.

### 5.1. Revisions to Chapter 4 that Align NFPA 1033 with NFPA 921

A close examination of Chapter 4, the heart of NFPA 1033, exemplifies how the addition of a word or phrase to existing text can be significant once the reasoning behind the change is understood. For example, the 2022 edition requires fire damage and fire patterns not only to be “interpreted” but also to be “analyzed.” Here is how the NFPA 1033 TC explained these changes:

The committee added the word “analyzing” in an effort to align the language and concept with terms utilized

in applying the scientific method, e.g. “analyze the data” to fire investigation. The term “interpret” was left in the section to be consistent with NFPA 921, Chapter 6.1.1., in which it uses both interpret and analyze when discussing fire patterns.<sup>13</sup>

In this context, remember that NFPA 1033 makes it mandatory for the investigator to utilize the scientific method throughout each investigation,<sup>14</sup> referencing NFPA 921 in this respect.<sup>15</sup>

Other changes were made to make the JPRs in Chapter 4 more consistent with NFPA 921. For example, this is how the NFPA 1033 TC explained changes to subsection 4.2.4 dealing with the requirement to interpret and analyze fire patterns:

The committee added specific benchmarks to the broadly stated requirements regarding the accurate analysis of fire patterns, including ventilation, the stages of fire development and sequential pattern analysis. Text changes were made to make this section more consistent with terminology used in the application of these requirements in other literature including NFPA 921. Additional detail is provided in both “requisite knowledge” and “requisite skills” to provide guidance for curriculum development and training in the specific areas noted within the JPR.<sup>16</sup>

Below are the revisions to subsection 4.2.4 in legislative text:

4.2.4 Interpret and analyze fire patterns, given standard equipment and tools and some structural or content remains, so that each individual pattern is evaluated identified and analyzed with respect to the burning characteristics of the material involved, and in context and the stage of fire development, the effects of ventilation within the context of the scene, the relationship with all patterns observed, and the mechanisms understanding of the methods of heat transfer that led to the formation of the pattern patterns identified and analyzed, and the sequence in which the patterns were produced is determined.

(A) Requisite Knowledge. Fire dynamics, including stages of fire development; methods of heat transfer; compartment fire development; and the interrelationship of heat release rate (HRR), form, and ignitibility of materials; and the impact and effects of ventilation on the creation of the fire patterns.

(B) Requisite Skills. Ability to interpret and analyze the effects of burning characteristics of the fuel involved and the effects of ventilation on different types of materials.

The extent of these revisions may not be fully appreciated unless a person studies the scientific literature addressing topics such as fire science, fire dynamics, and fire pattern development. NFPA 1033 does not make it mandatory for an investigator to consult NFPA 921. However, since the TC expressly mentioned this document in substantiating its decision to revise 4.2.4, studying the relevant chapters of NFPA 921 together with the associated Annex A references are good starting places towards satisfying these new requirements.

In other places the 2022 edition was revised to add concepts from NFPA 921 to the relevant JPRs in 1033. Examples are the addition of the references to sequential pattern analysis in s. 4.2.5<sup>17</sup> and to avoiding spoliation of evidence in s. 4.2.6.<sup>18</sup> Note that the summary in this article of the revisions to Chapter 4 are not exhaustive and we encourage our readers to consult the First Draft Report and Second Draft Report, together

with the Public Inputs, Public Comments, and Committee Statements accompanying the First and Second Revisions, available on the NFPA 1033 Document Information Page.

## 5.2. Specific Cross-References in NFPA 1033 to NFPA 921

Other indications of the closer alignment of NFPA 1033 and NFPA 921 are the greater number of specific cross-references to NFPA 921 in NFPA 1033's 2022 edition than in the 2014 edition. Here is a list:

- Extract tags have been added to existing definitions in Chapter 3 *Definitions* so that readers can readily see which ones are from NFPA 921, 2021 ed. (i.e., “Fire Analysis,” “Fire Dynamics,” “Fire Investigation,” and “Fire Science.”)
- Additional definitions from NFPA 921 that address concepts covered in the JPRs have been added to Chapter 3: “Explosion Dynamics,” “Failure Analysis,” “Fire Chemistry,” “Fuel Gas,” and “Heat Transfer.” These definitions include extract tags identifying NFPA 921, 2021 edition as the source.
- Chapter 2 *Referenced Publications* now lists NFPA 921, 2021 ed. in s. 2.4 *References for Extracts in Mandatory Sections* (aligning Chapter 2 with the definitions from NFPA 921 in Chapter 3.)
- A new Annex A reference A.4.1.7 states that up-to-date information on the list of topics in 4.1.7 can be found in the current edition of NFPA 921. (This accords with the 2014 edition Annex A reference to NFPA 921 as a source of information for the list of 16 in 1.3.7.)
- Information regarding the subjects in the new 4.1.7 provided in the new Annex D is cross-referenced to the relevant chapters in NFPA 921. The following NFPA 921 chapters are specifically referenced: Chapters 4, 5, 6, 8, 9, 12, 13, 16, 17, 18, 19, 22, 23.
- As in the 2014 edition, 4.1.2 makes it mandatory for the investigator to employ “all elements of the scientific method and the operating analytical process throughout the investigation and for the drawing of conclusions.” The key steps in the scientific method in Annex A, A.4.1.2 are from the explanation of the scientific method in the “*methodology chapter*” of NFPA 921 (i.e., Chapter 4 *Basic Methodology*). These steps have been updated to conform to those used in Figure 4.3 of NFPA 921, 2021 ed. (revised from NFPA 921, 2017 ed.).
- As it did in the 2014 edition, Annex A in the 2022 edition continues to cross-reference NFPA 921 concerning investigator safety (A.4.2.2.).
- Annex E *Informational References* (formerly Annex C in the 2014 edition), updates the reference to NFPA 921 to the current (2021) edition.

Now that we have examined some of the ways that NFPA 1033, 2022 ed. has stronger ties to NFPA 921, the next section considers some effects of this closer relationship.

## 5.3. Some Implications of the Integration of NFPA 1033 and NFPA 921

Over several revision cycles, the TCs responsible for NFPA 921 and NFPA 1033 have made efforts to coordinate these two documents. One reason is to ensure that material necessary for an investigator to comply with the NFPA

1033 requirements is contained in NFPA 921, at least on an elementary level.<sup>19</sup> This closer integration of NFPA 1033 and NFPA 921 has several consequences. In many ways the results are immensely helpful, but it also raises the bar for fire investigators.

The first consequence of the alignment of these documents is for those developing fire investigator certification and training programs such as those offered by the IAAI, the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), and the National Association of Fire Investigators (NAFI). These programs rely heavily on both NFPA 1033 and NFPA 921. NFPA 1033 specifies the knowledge and skills required by an investigator, but it is not a source of this information. It is much easier to use NFPA 921 as a tool to teach the mandatory requirements of NFPA 1033 when common definitions, terminology, and concepts are shared between the two documents. Therefore, the further integration between the latest editions of these two documents facilitates the development of certification and other training programs that rely on both.

The second consequence is for the practical application of NFPA 1033 by the investigator in the field. The more closely tied the requirements of NFPA 1033 are with the knowledge base in NFPA 921, the easier it is for a fire investigator to comply with NFPA 1033 by relying on NFPA 921 rather than having to undertake research using other scientific literature.

The number of published scientific studies, technical reports, and other authoritative references in the fire investigation field are proliferating. Without a central reference source such as NFPA 921 that specifically addresses NFPA 1033's JPRs, it would be challenging for an investigator to compile all of the resources necessary to apply NFPA 1033 in a timely way for a given investigation, particularly for a large or complex incident.

The third consequence is that even though the closer ties between NFPA 1033 and NFPA 921 may be helpful, they have a combined effect of increasing the qualification requirements and raising the standard of care for fire investigators. NFPA 921 is on a cycle that causes a new edition to be issued about every three years. With each new edition, the document becomes longer and the information it contains becomes more complex. This reflects the growing understanding of the science behind fire investigations.

As but one example, consider the changes in NFPA 921 over time respecting the effect of ventilation on the development of a fire and fire patterns. With the revisions to the latest edition of NFPA 1033 keying in on this and other issues, it compels investigators to keep up on the rapidly growing scientific knowledge behind fire investigations and to learn how to apply this knowledge. Since NFPA 921 has no mandatory requirements and is merely a guide, arguably investigators need not follow NFPA 921. However, with so many parts of NFPA 1033, which is a mandatory standard, connecting to NFPA 921, the result is that the bar has been further raised.

The final consequence is for attorneys and for investigators who may testify as witnesses. Keep in mind that NFPA 1033 is an NFPA "standard" the body of which contains only mandatory requirements. Because it is mandatory, it is potentially a great tool for an attorney wanting to cross-examine an investigator who does not comply with NFPA 1033. However, because NFPA 1033 is a bare-bones framework, it does not supply sufficient information to evaluate whether an investigator has satisfied the JPRs on a given case.

For example, NFPA 1033 says an investigator shall "interpret and analyze fire patterns,"<sup>20</sup> but the explanation of what this means to either interpret or analyze patterns is not contained in NFPA 1033. NFPA 1033 does not even state what is a fire pattern. Therefore, without a detailed "how to" guide such as NFPA 921 that the attorney can directly tie to the NFPA 1033 requirement, it is difficult to construct lines of questions to assess whether an investigator has or has not done a sufficient job in this respect.

Investigators testifying as expert witnesses in depositions or trials have long evaded cross-examination on compliance with NFPA 921 by stating that it is "merely a guide." Now the closer integration between the mandatory requirements of NFPA 1033 and the recommendations of NFPA 921 effectively merge the two documents. This facilitates an attorney's cross-examination by using sections of NFPA 921 that can be tied to mandatory requirements of NFPA 1033.

It is wise to remember that together, NFPA 1033 and NFPA 921 are not only a weapon to be used against an investigator. They are equally available to the attorney who calls the investigator as a witness to demonstrate that the investigator has complied with these important industry standards.<sup>21</sup> For investigators who comply with NFPA 1033 and rely on NFPA 921, these two standards can also be used by the investigator or the attorney calling the investigator as an expert witness to help fend off a *Daubert* challenge or to improve the weight given to the investigator's testimony.

Now while the closer relationship between NFPA 1033 and NFPA 921 have a number of implications, they do not dictate how every investigation is to be handled. NFPA 1033 requires the fire investigator to have certain skills and knowledge and to be able to demonstrate the ability to perform certain tasks. However, neither NFPA 1033 nor NFPA 921 requires the investigator to perform these tasks at every fire scene. Consider NFPA 1033 subsection 4.3.1, which requires the investigator to be able to diagram a scene. Neither NFPA 1033 nor NFPA 921 requires that every scene be diagrammed. Therefore, the conduct of a particular investigation is still subject to the exercise of judgment or adherence to the investigator's organizational protocols.

## 6. NFPA 1033's New Requirement that Opinions Be Supported by Scientific References

As demonstrated by revisions in each successive edition of NFPA 921, there is a growing body of research and scientific literature relevant to fire investigations. Prior to the 2022 edition of NFPA 1033, the investigator was not required to consult any scientific literature before formulating an opinion. A small but meaningful change in the new edition now requires that such reference material be considered:

4.6.5\* Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, **scientific references**, and evidence.<sup>22</sup> [Emphasis added.]

The Committee Statement substantiating this revision indicates that the NFPA 1033 TC agreed with the intent of the submitter of four Public Comments.<sup>23</sup> These Public Comments stated in part that, "It is necessary for investigators to consider if there is existing scientific, engineering, or technical research that is relevant to their investigation."<sup>24</sup> Further, while the 2014

edition of NFPA 1033 instructs that an investigator must be able to identify “reports and documents” necessary for the investigation, it fails to require that the investigator identify relevant scientific literature.<sup>25</sup>

Therefore, the NFPA 1033 TC revised subsection 4.6.5 to direct the investigator to ensure the opinion is supported by scientific references, in addition to the other material listed. Presumably, the scientific references may come from NFPA 921, any of its relevant Annex A publications, or any other relevant and authoritative scientific or engineering literature. Thus, this addition of just two words to the mandatory requirements of NFPA 1033 is another way that more is expected of fire investigators than with previous editions.

It is worth mentioning that scientific studies and other references can only serve to help test a hypothesis. They are not necessarily proof what happened at a particular scene. For example, data from an investigation might cause the investigator to develop the hypothesis that sunlight reflected through glass ignited a material. Scientific research establishes that reflected sunlight can be a competent ignition source for certain materials in certain conditions. However, as NFPA 921 says, “When relying on the research of others, the investigator or analyst must ensure that the conditions, circumstances, and variables of the research and those of the hypothesis are sufficiently similar.”<sup>26</sup> Therefore, scientific research alone will not bring the investigator to a final hypothesis. The investigator must still test the hypothesis using other data from THIS incident to determine whether the facts support this hypothesis to the exclusion of all other reasonable hypotheses.<sup>27</sup>

## 7. NFPA 921, 2021 ed. Errata and Tentative Interim Amendment

An Errata was issued on May 6, 2021, to correct two errors in Annex A references for NFPA 921, 2021 ed., Chapter 17 Physical Evidence. The first correction deals with the Annex A reference for s.17.5.4.6 “Comparison Samples.” The second deals with the Annex A reference for s.17.7.5 “Canine-Handler Teams.” The revised paragraphs now read:

A.17.5.4.6 For more information, see IAAI Forensic Science Committee, “Position on Comparison Samples,” *Fire and Arson Investigator*. Vol. 41, No. 2 (December 1990).

A.17.7.5 For more information on the qualifications of canine-handler teams including maintenance training, proficiency testing, and certification requirements see the guidelines developed and published by the Scientific Working Group on Dog and Orthogonal Detector Guidelines (SWGDOG) published in Furton, K., Greb, J., and Holness, H., “The Scientific Working Group on Dog and Orthogonal Detector Guidelines (SWGDOG),” Doc. No. 231952 (September 2010) available at <https://www.ncjrs.gov/pdffiles1/nij/grants/231952.pdf>.

The Errata officially changes the text for the 2021 edition and we recommend you download the document for your records from the NFPA 921 Document Information Page. Open the “Current & Prior Editions” tab, select the “2021 edition” from the dropdown field, and scroll down to the “Errata” section for the download.

In case you missed it in the FISC Bulletin Board from the January 2021 edition of the *Fire & Arson Investigator Journal*, a Tentative Interim Amendment (TIA) was issued in December

2020 to make important corrections in the 2021 edition.<sup>28</sup> The TIA corrected the definition of “fire patterns” in Chapter 3 *Definitions*, s. 3.3.78. It also revised Figure 6.1.5 *Example of Applying the Scientific Method to Fire Pattern Interpretation in Chapter 6 Fire Effects and Fire Patterns*. The TIA, is available for download on the NFPA 921 Document Information Page, just above the “Errata” section described above.

## 8. Next Edition of NFPA 921 is Underway

The NFPA is planning the next edition of NFPA 921 to be issued in 2023,<sup>29</sup> as a 2024 edition. It usually takes about two years for a standard to complete its cycle.<sup>30</sup> The process encourages public participation in the revision of each standard.<sup>31</sup> Thus the first step in the NFPA Standards development process is the “Public Input” stage,<sup>32</sup> which we discuss next.

### 8.1. Public Inputs Open until November 10th, 2021

NFPA has announced that the Public Input period for the next edition of NFPA 921 has opened, with a closing date of November 10, 2021. Anyone can submit a Public Input. There is a link on the NFPA 921 Document Information Page, “Next Edition” tab. Click the link “Submit a Public Input” and the TerraView™ app will open, providing an entry point for anyone who wants to participate in the NFPA Standards development process. The first step in this process is Public Input stage, whereby you can propose changes to NFPA 921 that the *Technical Committee on Fire Investigations* responsible for NFPA 921 (the NFPA 921 TC) will consider when preparing the next edition of NFPA 921.

A person can propose a change by submitting a document called a Public Input. You can create and submit them electronically through the TerraView™ site that you access from the link on the NFPA 921 Document Information Page. You can submit a Public Input to, 1) Add a new section, 2) Revise existing section(s), or 3) Create a global revision to add, modify, or delete a word or phrase throughout the entire document. Complete instructions are available on the landing page in the TerraView™ site. A complete copy of NFPA 921, 2021 edition is made available online that eases the process of creating Public Inputs.

As the 2022 edition of NFPA 1033 is more closely synchronized with NFPA 921 than ever before, the revisions to NFPA 1033 may provide inspiration for Public Inputs for NFPA 921’s next edition. Therefore, we recommend that you review the changes in NFPA 1033 with the NFPA 921’s current (2021 edition) at hand.

Note that you can draft Public Inputs and leave them in the system until you are ready to submit them, but any unsubmitted Public Inputs will be automatically deleted from the system on the Public Input closing date. All Public Inputs must be submitted by **5:00 pm EST/EDST on November 10, 2021**.

### 8.2. Task Groups

The NFPA 921 TC has begun preparations for the next edition of NFPA 921, which is expected to be completed by 2024 or earlier. Chair James H. Shanley, Jr., PE, CFEI held a virtual meeting of the TC in October 2020, during which TC members presented proposals for new Task Groups.

A task group is an ad hoc group appointed by the TC chair to address a particular topic. The task groups consist of TC members and non-members, all of whom have an interest in the assignment given to the task group. All task group chairs

and members are appointed by Chair Shanley. Each of the task groups are evaluating particular sections or chapters of NFPA 921 with a view to making recommendations to the full TC respecting possible revisions for the 2024 edition.

As a result of the presentations and with input from the TC members, Chair Shanley has created seven new task groups:

1. Marine TG chaired by Rick Jones, IAAI Immediate Past President, and NFPA 921 TC member.
2. Safety TG chaired by Joe Sesniak, IAAI Representative on the NFPA 921 TC, Past member on the IAAI Board of Directors, Vice President of the IAAI Foundation, and FISC member.
3. Certainty of Opinions TG chaired by Terry-Dawn Hewitt, IAAI FISC Chair and NFPA 921 TC member.
4. Arc Mapping TG chaired by Jason Karasinski, IAAI Training & Education Committee and NFPA 921 TC member.
5. Patterns/NFPA 1700 TG chaired by Dan Gottuk, Technical Director and Senior Vice President of Advanced Solutions at Jensen Hughes, OSAC Fire and Explosion Investigations Subcommittee member, and NFPA 921 TC member.
6. Wildland TG chaired by Stephen Rinaldi, IAAI member and NFPA 921 TC member.
7. Motor Vehicle TG chaired by Thomas W. "Rusty" Horton, Jr., IAAI member and NFPA 921 TC member.

The task groups will be reporting their progress to the full TC at a meeting scheduled for early July 2021. Later in 2021 the TGs will deliver final reports to the NFPA 921 TC, which the TC may act on by creating Public Inputs for the 2024 edition before the November 10th deadline.

## 9. Other News: OSAC Registry Implementation Survey

As we have explained in other FISC Bulletin Board articles, NFPA 921 and NFPA 1033 are OSAC Registry Standards. OSAC has recently announced its interest in understanding how organizations are using standards on the OSAC Registry and what support they need to improve implementation of these standards. To this end, OSAC is releasing the first of an annual survey that will assess the current state of Registry implementation. OSAC's website announcement says:

OSAC is seeking to understand how forensic science organizations are using standards on the OSAC Registry and what support they may need to improve standards implementation. The OSAC Registry Implementation Survey is a tool to help us obtain this information and will be used to assess the current state and identify potential barriers to implementation.

We need to hear from the nation's forensic science service providers! Please help us by completing this survey (one response per location, please). It will take approximately 15-45 minutes to complete and must be done in one sitting. ... The survey is live and will close August 20, 2021.<sup>33</sup>

When reading this announcement, keep in mind that organizations (public or private) that provide fire investigation services are considered "forensic science service providers."<sup>34</sup>

The OSAC survey webpage has a PDF copy of the survey

available for review and frequently asked questions.<sup>35</sup> We encourage our readers who represent organizations that provide fire investigation services to participate. The results of this survey may provide important information about the extent that standards are being employed in our field. These include NFPA 921, NFPA 1033 and other OSAC Registry standards such as those published by ASTM relevant to fire debris and explosives analysis.

## 10. Conclusion

We hope that our highlights of the evolution of NFPA 1033 and NFPA 921 are useful. However, there are more to both documents than we are able to cover in this article. We urge you to explore the information available on the NFPA Document Information Page for each of these standards.

NFPA 1033 is brief, and the body of the standard contains no explanations, just mandatory requirements. Each word or phrase may have connotations that are not readily apparent. Consider for example the implications of the new phrase "scientific reference" in section 4.6.5 that we discussed in section 5 of this article. Therefore, we suggest that you trace the history of each revision by reviewing the First Draft Report and Second Draft Report leading up to the 2022 edition. Even Public Inputs and Public Comments that did not result in revisions are often thought provoking. They reflect the ideas of others in our field and sometimes indicate future trends or litigation issues.

Finally, consider getting involved in the NFPA standards development process by submitting one or more Public Inputs for the next edition of NFPA 921. (Note the 5:00 pm EST/ESDT November 10, 2021, deadline.) It is an invaluable learning experience!

## Acknowledgements

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 George Wendt, IAAI-CFI® (former NFPA 1033 TC Chair);  
 Jeff Williams, IAAI-FIT, IAAI-CI, IAAI-CFI®.

## ENDNOTES

- 1 **Disclaimer:** To the extent that this article contains opinions, they are the opinions of the authors and not of the International Ass'n of Arson Investigators (IAAI), the IAAI Fire Investigation Standards Committee (FISC), or the National Fire Protection Association.
- 2 In addition to their membership on the IAAI's Fire Investigation Standards Committee (FISC), Terry-Dawn Hewitt is a principal member of the NFPA 921 TC and Wayne McKenna is her alternate. Wayne McKenna is a principal member of the NFPA 1033 TC and Terry-Dawn Hewitt is his alternate. Both authors attended all of the technical committee meetings in the revision cycles for the latest editions of NFPA 1033 and NFPA 921.
- 3 See the NFPA 921 Document Information Page, Next Edition Tab available at <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=921&tab=nextedition> (last visited June 16, 2021), that states:

Please note: This Standard is in a custom cycle due to the Emergency Response and Responder Safety Document Consolidation Plan (consolidation plan) as approved by the NFPA Standards Council. As part of the consolidation plan, this Standard is re-open for Public Input with a closing date of November 10, 2021.
- The consolidation plan, available at <https://www.nfpa.org/errs>, states that NFPA 921 is in a group of standards the NFPA is "planning to be issued in 2023."
- 4 As of June 16, 2021, the NFPA Catalog page for NFPA 1033, available at <https://catalog.nfpa.org/NFPA-1033-Standard-for-Professional-Qualifications-for-Fire-Investigator-P1396.aspx>, indicates that the print edition of NFPA 1033 will be available on July 16, 2021. The standard will be issued by the NFPA Standards Council before the NFPA will publish it in either print or electronic form.
- 5 See NFPA 1033 Document Information Page available at <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1033>. If this link does not work, go to the NFPA Home Page at <https://www.NFPA.org>, next click the "Codes and Standards" link, click "List of NFPA codes & standards" link, and then enter "1033" in the search field to access the Document Information Page for NFPA 1033. Once you are on the Document Information Page, scroll down and click the tabs to explore "Current and Prior Editions," "Next Edition," "Technical Committee," and other helpful information.
- 6 The URL to the NFPA 1033, 2022 ed. catalog page is <https://catalog.nfpa.org/NFPA-1033-Standard-for-Professional-Qualifications-for-Fire-Investigator-P1396.aspx>. At the time of writing this column in June 2022, the NFPA 1033 catalog page states that the 2022 print edition will be available on July 16, 2021, for the price of \$47.50.
- 7 Once you land on the NFPA 1033 Document Information Page, scroll down and then select the "Current and Prior Editions" tab. Select "2022 Edition" from the drop-down menu. Click the "Select" button. Scroll down, and under the heading "Archived Revision Information" you will see "view"

buttons to open the First Draft Report or the Second Draft Report. The TerraView™ app will open. Navigate through each chapter using the menu on the left of your screen, and then scroll down to the section in issue.

- 8 NAT'L FIRE PROT. ASS'N TECHNICAL COMM. ON FIRE INVESTIGATOR PROFESSIONAL QUALIFICATIONS, NFPA 1033 STANDARD FOR PROFESSIONAL QUALIFICATIONS FOR FIRE INVESTIGATOR [hereinafter NFPA 1033] (2022 ed.) s. 3.3.17. We use the short form, "NFPA 1033" when referring generally to that document, in whatever edition is applicable in the context. When referring to a specific edition of NFPA 1033, the edition is also cited.
- 9 NFPA 1033, 2022 ed. s.A.4.1.1.
- 10 NFPA 1033, 2022 ed. s.4.2.2.
- 11 NFPA 1033 TC Committee Statement, First Revision No. 1-NFPA 1033 2019.
- 12 NAT'L FIRE PROT. ASS'N TECHNICAL COMM. ON FIRE INVESTIGATIONS, NFPA 921 GUIDE FOR FIRE AND EXPLOSION INVESTIGATIONS (2021 ed.) s. 3.3.196 (hereinafter NFPA 921, 2021 ed.).
- 13 Committee Statement, First Revision No. 9-NFPA 1033-2019 [Section No. 4.2 [Excluding any Sub-Sections]], Committee Statement, First Revision No. 10-NFPA 1033-2019 [Section No. 4.2.2], and Committee Statement, First Revision No. 11-NFPA 1033-2019 [Section No. 4.2.4].
- 14 NFPA 1033, 2022 ed. s. 4.1.2.
- 15 NFPA 1033, 2022 ed. s. A.4.1.2.
- 16 First Revision No. 11-NFPA 1033-2019 [Section No. 4.2.4].
- 17 First Revision No. 16-NFPA 1033-2019 [Section No. 4.2.5].
- 18 First Revision No. 17-NFPA 1033-2019 [Section No. 4.2.6].
- 19 See NFPA 1033, 2022 ed. s. A.4.1.7, which refers the reader to NFPA 921 for up-to-date information on the topics listed in s. 4.1.7 but cautions that these concepts are presented in NFPA 921 at an elementary level and that additional resources may need to be utilized.
- 20 NFPA 1033, 2022 ed. s. 4.2.4 & 4.2.5.
- 21 Remember that when used in a generic sense as here, the word "standard" includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides, including both NFPA 1033 and NFPA 921. See NFPA 1033, 2022 ed. s. 3.2.7.
- 22 NFPA 1033, 2022 ed. s.4.6.5.]
- 23 Committee Statement, Second Revision No. 7-NFPA 1033-2020 [Section No. 4.6.5], "The committee agrees with what the submitter's intent was with the submission of PC's 15, 16, 17, and 18 and believe that by making this change it addresses the submitter's concerns."
- 24 Substantiation, Public Comment No. 18-NFPA 1033-2020 [Section No. 4.6.1[Excluding any Sub-Sections]].



25 Substantiation, Public Comment No. 16-NFPA 1033-2020 [Section No. 4.6.1(B)]:

This section addresses the investigator's need to identify "reports and documents" necessary for the investigation. Nowhere in NFPA 1033 is the investigator instructed to identify relevant scientific literature. There is a growing body of scientific research and publications that may be critical to making accurate determinations in a fire investigation. The investigator should be specifically told to identify any scientific literature that may be relevant. As some investigators may not have the developed the skill of conducting a literature review, which is necessary in order to identify relevant scientific publications, we are also submitting a public comment for an addition to the Annex with instructions on how to develop this skill.

While the Public Comment proposed a revision to s. 4.6.1, the NFPA 1033 TC, with the submitter's agreement, decided it was more appropriate to revise s. 4.6.5, adding the reference to "scientific references."

26 *NFPA 921*, 2021 ed., 4.3.6.

27 *See NFPA 921*, 2021 ed., 4.3.7.

28 *See* TIA Log 1528, which is available on the NFPA 921 Document Information Page available at <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=921>. Click the "Current and Prior Editions" tab, select the "2021" edition from the dropdown menu, and then scroll down the page to view or download the TIA.

Chapter 6 *Fire Effects and Fire Patterns* was given a complete overhaul for the 2021 edition. Through an oversight, the description of "fire patterns" in the revised Chapter 6 section 6.3.18 was inconsistent with the existing (2017 edition) definition of "Fire Patterns" in 3.3.78. The committee intended that the Chapter 3 definition be consistent with the description in the new, approved revised text in Chapter 6. To correct this error, a TIA was issued to revise the definition in Chapter 3 of the new edition bringing it into line with the new Chapter 6.28 The revised definition reads, "**3.3.78 Fire Patterns**. The visible or measurable physical changes, or identifiable shapes, formed by a fire effect or group of fire effects."

The TIA also revised parts of Figure 6.1.5 as follows:

[Fifth step in the figure]:

**Develop More than One Hypothesis Hypotheses**

Explanation for and significance of

Fire fire patterns

Inductive reasoning

[Sixth step in the figure]:

Test the Hypothesis for Validity Hypotheses

For more discussion of this TIA, see FISC Bulletin Board, "*Tell Me Something I Don't Know*" about NFPA 921, 2021 Edition, *Fire and Arson Investigator Journal*, (IAAI: Bowie, Maryland, Vol. 71, No. 3, 38, Jan. 2021). IAAI Members can download the *Journal* from the IAAI <https://www.firearson.com/> website, under the "Publications & Resources" link.

29 *See* the NFPA 921 Document Information Page, Next Edition Tab available at <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=921&tab=nextedition> (last visited June 16, 2021), that states:

Please note: This Standard is in a custom cycle due to the Emergency Response and Responder Safety Document Consolidation Plan (consolidation plan) as approved by the NFPA Standards Council. As part of the consolidation plan, this Standard is re-open for Public Input with a closing date of November 10, 2021.

The consolidation plan, available at <https://www.nfpa.org/errs>, states that NFPA 921 is in a group of standards the NFPA is "planning to be issued in 2023."

30 NFPA, *How the NFPA standards development process works* webpage, available at: <https://nfpa.org/Codes-and-Standards/Standards-Development/How-the-process-works>.

31 *Id.*

32 *Id.*

33 OSAC Registry Implementation Survey webpage available at <https://www.nist.gov/osac/osac-registry-implementation-survey> (last visited June 16, 2021).

34 *See* the OSAC Registry Implementation Survey, available at <https://www.nist.gov/osac/osac-registry-implementation-survey>, which is directed to "forensic science service providers" and lists the forensic disciplines covered by the survey to include "Fire & Explosion Investigation (Scene collection)."

35 *Id.*