GUIDE FOR PEER REVIEW IN THE FIRE PROTECTION DESIGN PROCESS

SFPE Peer Review Task Group

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1.0 PURPOSE

These guidelines address the initiation, scope, conduct, and report of a peer review of a fire protection engineering work product. A peer review may be conducted on a fire protection engineering work product, including but not limited to, conceptual approaches, supporting analyses, calculations, application or interpretation of code requirements.

Peer review is a tool that can be used to help a stakeholder make decisions regarding the suitability of a design. Typically, a peer review is sought by a reviewing authority to provide a second opinion regarding a work products’ likelihood of achieving the stated objectives. However, other situations may also necessitate a peer review.

1.1 Audience

These guidelines provide guidance to members of the Society of Fire Protection Engineers and others in the fire protection engineering community concerning the peer review process of a fire protection engineering work product. This includes any stakeholder that has an interest in a fire protection work product that requires a peer-review such as fire protection engineers, project engineers of other disciplines, architects, code officials/authorities having jurisdiction, fire department representatives, building owners or owners representatives, and insurance interests.

1.2 Limitations

This engineering guide is not applicable to the following types of fire protection engineering projects:

- **Fire Investigations/Post Incident Investigations**

  This guide does not specifically contemplate the unique procedures and complexities of such investigations.
• **Post-Project Review**

Reviews being conducted after the substantial completion of a project for the purposes of learning best practices (often known in the industry as “lessons learned”) that can be applied in future engineering designs, documents and procedures.

• **Third Party Inspection**

Some stakeholders may also utilize third parties to undertake inspections of completed installations. As the scope of these inspections is typically related to compliance of the completed installation with the previously reviewed design documents, such inspections are outside the scope of a peer review as covered by these guidelines.

### 1.3 Definitions

**Approved.** Acceptable to the stakeholder.

**Engineering Tools.** Can include but not limited to deterministic analysis, probabilistic analysis techniques, application of the theory of the fire dynamics, application of deterministic and probabilistic fire effects modeling, and application of human behavior and toxic effects modeling.

**Fire Protection Engineer.** The term “fire protection engineer” should be viewed as synonymous with the terms “fire safety engineer” and “fire engineer.” These terms apply to a person who applies engineering principles to prevent and mitigate the unwanted impact of fire. For practical purposes, only the term fire protection engineer is used in the remainder of the document.

**Fire Protection Engineering Work Product.** Any deliverable including but not limited to drawings, calculations, datasheets, etc. that are related to the fire protection strategy being reviewed.

**Peer Review.** A practice of independent and unbiased evaluation of sound engineering principles, judgement and their proper application in the conceptual approach and technical basis of a work product, through processes where qualified professionals having experience in the field of expertise evaluate, maintain and monitor quality assessment and control of engineering services, prepare internal lessons learned, or exercise any combination of such responsibilities.
Reviewer. An individual competent in the subject matter to be reviewed having education, training and experience, and able to apply scientific and engineering principles, practices, standards and judgement, to evaluate design concepts and performance objectives, and their solution results.

Stakeholder. One who has a share or an interest, as in an enterprise. Specifically, an individual, or representative of same, having an interest in the successful completion of a project. The reason for having an interest in the successful completion of a project might be financial, safety related, etc. Not all stakeholders have equal authority or input into the process. The degree of stakeholder involvement depends on many factors, including the type of project management and delivery system.

1.4 Qualifications

As stated in the SFPE Recommended Minimum Technical Core Competencies for the Practice of Fire Protection Engineering, [1] SFPE recognizes that:

Requirements governing the use of the term “engineer” or the ability to practice “engineering” vary widely around the world. In some countries, one can call themselves an engineer on graduation with a university degree in engineering. Conversely, some jurisdictions may have very specific governing regulations that specify in great detail the knowledge and experience required before legally using the term “engineer” or, with respect to fire, the term “fire protection engineer.” In contrast, many parts of the world have no prescriptive or performance requirements governing the knowledge and experience required to practice engineering, or fire protection engineering in particular.

The same context applies to the reviewer’s qualifications. Documentation of the reviewer’s qualifications should include at least one of the following: [2]

- Registration, licensing or certification, when specifically required by a local authority,
- Certification by an organization acceptable to the authority having jurisdiction,
- Manufacturer’s certification for the specific type and brand of system provided for reviews involving fire protection system designs,
- Education including relevant degrees and/or applicable academic research,
- Other related experience not included in categories listed above.

It should be noted that reviewers may have enough experience in one or multiple fire protection engineering fields, without necessarily having any registration, licensing or certification. Examples of such qualifications include experience and/or research in the subject matter of the fire protection work product. The appropriate amount of experience should be determined by the stakeholders.

These qualifications should be documented and approved by the stakeholders.
2.0 **SCOPE OF A PEER REVIEW**

2.1 **Breadth of a Peer Review**

The scope of the peer review may be a complete review of the entire documentation, including compliance with applicable codes and standards and the appropriateness of the assumptions, engineering methods and input data used to support the design. Alternatively, the scope of the peer review may be limited to specific aspects of the work product, such as specific models or methods and their associated input data and conclusions drawn from the output data.

Agreement on the scope of the peer review should be achieved between the stakeholders and the reviewer. The scope should be explicitly identified at the time of execution of the agreement to undertake the peer review. Any changes to the scope should be agreed to by both the stakeholders and the reviewer.

The peer review should be limited to only the technical aspects of the design documentation. The peer review should not evaluate the education, experience or other personal aspects of the person or company that prepared the work product. However, this does not exclude raising ethical concerns if identified during the peer review.

2.2 **Components of a Peer Review**

Whether the scope of the peer review is the complete documentation of a project or some specific aspect of it, the reviewer should consider the following components, as appropriate to the design being reviewed such as but not limited to:

- Design objectives,
- Applicable codes, standards and guides.
- Assumptions made (e.g., performance criteria, design fire scenarios, leakage rates, material properties used in correlations or models),
- Technical approach,
- Appropriateness of models and methods used to solve the design problem (see...
SFPE Engineering Guide for Substantiating a Fire Model for a Given Application [3]),

- Input data to the design problem and to the models and methods used,
- Appropriateness of the output data,
- Appropriateness of recommendations or conclusions,
- Correctness in the execution of the design approach (e.g., no mathematical errors or errors in interpretation of input or output data).
3.0 INITIATION OF A PEER REVIEW

3.1 Background

The decision to initiate a peer review is typically made by a project stakeholder, whose interest may be safety, financial, environmental or cultural heritage. A peer review is often commissioned by an enforcement official; however, other stakeholders may also commission such a review. This decision usually follows the design development of a project and is occasionally a prescribed part of the design review and approval process. A determination to initiate a peer review may be made during any phase of a project (i.e. preliminary project meeting, when presented with a project design brief, or when presented with a complete set of design documents).

Given that the use of a peer review may add time to the critical path of the design process, a stakeholder who seeks the advice of a reviewer should begin the process of identifying and contracting the reviewer as early as possible.

The motivation for a peer review may be a desire to have a better understanding of the quality, completeness or the scientific basis of the work product. The decision to conduct a peer review may also be made by a stakeholder who has resource limitations and wishes to bring in outside assistance to evaluate the fire safety features of the work product.

3.2 Choice of a Reviewer

The importance of a reviewer’s independence and technical expertise cannot be overemphasized. The reviewer should be objective and have no personal or corporate conflict of interest in the project. Any candidate being considered as a reviewer should disclose to the contracting stakeholder any conflict of interest or technical bias.

A reviewer should have the necessary knowledge and fire protection engineering or fire science expertise to understand and evaluate the work product that is being evaluated. See Section 1.4 (Qualifications). Reviewers should be able to demonstrate, through documented education and
experience, that they are competent to perform the requested peer review. Any specialized
costume or software that will be necessary to undertake the peer review, for example in using
specific tools or models, should be identified.

The choice of a reviewer should be approved by the stakeholders.

3.3 Identification of Agreement to Perform a Peer Review

Prior to commencing a review, the reviewer should execute an appropriate agreement with the
contracting stakeholder with a clearly defined scope in accordance with Section 2. Once this
agreement has been formalized, the contracting stakeholder should notify the design engineer of
record, and other appropriate parties, of the initiation of a peer review as required by applicable
ordinances, engineering practice acts, canons of ethics, etc. Commercially available sample
agreements of this type are available [4].
4.0 CONDUCT OF A PEER REVIEW

4.1 Standard of Care for a Peer Review

Within the agreed-to scope (Section 2.1), peer reviews should be conducted in accordance with the SFPE Code of Ethics for Fire Protection Engineers [5]. Reviewers must remain neutral in the review process and not influenced by one of the parties involved in the review.

Section 2.2 identifies the components of a work product that should be evaluated during a peer review. However, if a reviewer discovers deficiencies that fall outside of the scope of the review, those deficiencies should be brought to the attention of the stakeholders.

A peer review is often intended to ensure that the public’s safety goals, or the fire protection goals of other stakeholders are met. Generally, improvement of the design or value engineering is not the purpose of a peer review.

4.2 Communications

Communication between the reviewer and the stakeholders is encouraged. The methods of communication should be understood by all parties prior to the start of the peer review. Appropriate communications related to the peer review should be documented.

4.3 Impartiality and Focus

The reviewer should refrain from applying their own preferences when conducting the peer review. The peer review should focus on aspects that would have an impact on the stated objectives. Items that do not have an impact on the stated objectives may be included as observations or findings if amenable to the stakeholders.

4.4 Tools Required for Review

Reviewers should have sufficient documentation to determine if the tools and data that were used in the development of the work product are appropriate for the given application. A full evaluation of a work product may require that the designer provide the reviewer with access to
the tools used to develop the work product. In this case, the reviewer should respect any confidentiality and licensing issues associated with these tools. In some peer reviews, it may be necessary to use additional tools and data outside the original scope in order to perform checks on the results that were obtained during the development of the original design.

4.5 Intellectual Property Rights

During the peer review process, the reviewer should treat the information and materials as confidential and with privilege, and should not extract, copy, or reproduce through mechanical, electronic, or other means any or all of the concepts or approaches developed by the design engineer without permission.
5.0 REPORT OF A PEER REVIEW

5.1 Documentation

At the conclusion of a review, the reviewer should prepare a written record that identifies the scope of the review and the findings. The report should identify whether, in the reviewer's opinion, the design meets the design objectives. The items shown in Section 2.2 should be addressed in the report. Reviewers should substantiate any comments on appropriateness by references to published technical documentation.

5.2 Distribution

The results of a peer review should be communicated only to the contracting stakeholder. At the discretion of the contracting stakeholder, the results may be communicated to other interested parties. In some instances, when dictated by professional ethics, communication of the results to the appropriate enforcement officials may be necessary as determined by the reviewer. The SFPE Code of Ethics for Fire Protection Engineers should be consulted in these circumstances. [5]
6.0 CONCLUSION OF A PEER REVIEW

Peer review is an interactive process that may require the submission of supplemental information to the reviewer. It is not unusual to have several iterations of submissions between the reviewer and the designer.

In general, a peer review should be considered concluded when the written record is distributed to the contracting stakeholder, unless otherwise indicated in the initial agreement. The reviewer should execute all actions indicated in the initial agreement or provide substantiation why items were not completed.

In the eventuality, the peer review process cannot be concluded on some specific aspects or even globally (i.e. the reviewer cannot express his/her definitive opinion on the reviewed fire engineering product), the stakeholder who initiated the peer review can decide to stop the peer review at any point in the process.
7.0 REFERENCES


