



National Fire Protection Association
International

SC#98-113
D#00-13

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

9 May 2000

To: Interested Parties of Early Streamer Emission (ESE) Lightning Protection Systems

Subject: Decision on Council Agenda Item 98-113
Date of Decision: 28 April 2000*

Dear Interested Parties:

At its 27-28 April 2000 meeting, the Standards Council considered agenda item 98-113. Attached is the final decision of the Standards Council on this matter.

Sincerely,

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

CCG/djb

c: M. Brodoff, J. Caloggero, A. Cote, L. Nisbet, J. Shannon
Members, TC on Lightning Protection
Members, Standards Council
Interested Parties

*NOTE: Participants in NFPA's codes and standards making process should know that in limited circumstances, review of this decision may be sought from the NFPA Board of Directors. For the rules describing these circumstances 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. Since this Council decision is not "related to the issuance of a document" as referenced in 1-7.2 of the Regulations Governing Committee Projects, notice of the intent to file such a petition must be submitted to the Clerk of the Board of Directors within a reasonable period of time.

Standards Council Decision (Long Form):	D#00-13
Standards Council Agenda Item:	SC#98-113
Date of Decision:	28 April 2000
Subject: Early Streamer Emission (ESE) Lightning Protection Systems	

At its meeting on April 28, 2000 the Standards Council held a hearing to reopen the proceedings for consideration of the issuance of a standard for Early Streamer Emission (ESE) Lightning Protection Systems in accordance with the Council's Decision of October 8, 1998. The lengthy background leading to this hearing has been summarized in previous Standards Council Decisions. (For the history of previous proceedings, see especially, the following Standards Council Decisions: October 14, 1993, Agenda Item 93-100; January 12, 1994, D #94-11; July 18, 1995, D #95-26; October 8, 1998, D #98-40. See also Appeals to the Board of Directors of May 3, 1994 and December 7, 1995. For related proceedings concerning NFPA 780, *Standard for the Installation of Lightning Protection Systems*, see the Standards Council Decision of July 18, 1995, D #95-25 and the Appeal to the Board of Directors of December 7, 1995.)

The relevant history may be summarized as follows. The Technical Committee on Lightning Protection Systems using Early Streamer Emission Air Terminals was formed in January 1991. Proposed NFPA 781, *Standard for Lightning Protection Using Early Streamer Emission Air Terminals*, was published for public review and comment in the 1993 Fall Meeting Technical Committee Reports. It was then presented to the 1993 Fall Meeting in November of 1993, where the NFPA membership voted to return the document to committee.

Following that meeting, a Complaint was made to the Standards Council requesting that the Council reject the vote of the association membership and instead, immediately issue proposed NFPA 781. The Council concluded that the vote of the membership recommending the return of the document to committee indicated that "the consensus necessary to issue the document has not yet been achieved." The Council further concluded that this lack of consensus derived from "genuine and legitimate questions on whether the early streamer emission technology has been adequately demonstrated to be effective." The Council, therefore, deferred ruling on the issuance of the proposed document in order to allow for an independent third party review of the information currently available regarding the Early Streamer Emission (ESE) concept. (See Standards Council Decision of January 12, 1994, D #94-11.)

Thereafter, the Fire Protection Research Foundation arranged for the National Institute of Standards and Technology (NIST) to perform the independent third-party review requested by the Standards Council. NIST's final report became available in late April of 1995, and the Council convened a hearing, which took place on July 18, 1995, to consider that report. Following the hearing, the Council issued a decision concluding that, based on the NIST report and other information which had been presented to the Council, the proposed NFPA 781 should not be issued. In arriving at this conclusion, the Council noted as follows:

Proposed NFPA 781 is based on the assumption that ESE terminals provide a greater zone of protection than conventional terminals. It was undisputed,

moreover, that proposed NFPA 781 would permit ESE systems using far fewer terminals and far greater spacing between terminals than in a comparable conventional system installed according to NFPA 780. Given the absence of reliable evidence that those ESE terminals offer an increased zone of protection over that of conventional terminals, it seems clear that a sound technical basis for proposed NFPA 781 has not been demonstrated.

The Council went on to point out that the NIST report did not "invalidate the ESE concept, it merely concludes that the evidence that ESE systems provide meaningful enhancement over conventional systems has not been sufficiently developed." The Council noted that the report called for more research aimed at answering the many as yet unanswered questions about lightning in general and the ESE concept in particular. The Council concluded:

Given the current state of knowledge, it does not appear that the type of further research and evaluation recommended by the NIST Report will be available in the short term. In the view of the Council, therefore, continuing standards development activities for ESE systems, would, at present, serve no useful purpose. Accordingly, the Council has voted to discharge the Technical Committee on Lightning Protection Systems Using Early Streamer Emission Air Terminals with appreciation for their efforts. In so doing, the Council does not wish to imply that the NFPA is foreclosing future standards development in this or other new areas of lightning protection. Rather, it urges the proponents of this or any other alternative lightning protection technologies not currently served by NFPA 780 to petition the Council whenever they believe that the case can be made that the technology has been sufficiently validated to permit meaningful standards development. (See Standards Council Decision of July 18, 1995, D #95-26.)

Three years later, in 1998, a representative of Heary Bros. Lightning Protection Co. Inc., Lightning Preventor of America, Inc., and National Lightning Protection Corp. (the principal ESE proponents), made a request to the Standards Council asking the Council to reopen the proceedings for the issuance of a standard for ESE Lightning Protection Systems, and to conduct a *de novo* review, reweighing and considering all evidence anew, including evidence not previously available. The request specifically sought to have the Standards Council reopen the proceeding and reconsider the issuance of a standard for ESE Lightning Protection Systems along the lines set forth in a proposed settlement agreement which would resolve litigation by the requesting parties against the NFPA (Settlement Agreement). In a Decision of October 8, 1998 (D #98-40), the Council voted to grant the request and undertook to reopen the proceedings for consideration of the issuance of a standard for ESE Lightning Protection Systems in full accordance with the terms of the Settlement Agreement, a copy of which was made a part of the record.

Pursuant to the Council's decision and the terms of the Settlement Agreement, the Council authorized the creation of an independent panel to consider information submitted by any interested persons and to issue a report concerning ESE lightning protection technology to the Standards Council. The panel was charged with addressing the following issues, and any other

issues it deemed relevant: (1) whether the ESE lightning protection technology is scientifically and technically sound; and (2) whether the ESE lightning protection technology is supported by adequate scientific theoretical basis and laboratory testing.

As proposed by the principal ESE proponents and set forth in the Settlement Agreement, the panel was chaired by Dr. John L. Bryan, Ph.D. Dr. Bryan chose, as additional panel members, Richard Biermann and Glenn Erickson. After soliciting public input, the Panel developed its Report (Bryan Panel Report), and the Council received the Report at its meeting of September 30, 1999. The Council voted to make the Report, and any material submitted to the panel in connection with the Report, available for public review and comment and to hold a hearing at its April 27, 2000 meeting to consider the Report and related requests.

That hearing has now taken place and, having reopened the proceedings on the issuance of a standard for ESE Lightning Protection Systems, the Council must, first and foremost, do what it agreed to do in its decision of October 8, 1998. Specifically the Council undertook under the terms of the Settlement Agreement, to consider the issuance of a standard for ESE systems that would be "separate and distinct from NFPA 780." (Settlement Agreement at 1, f, p.4) More specifically, the Agreement stated:

The Standards Council will make the determination in accordance with the NFPA's rules and regulations as to whether to issue an NFPA standard for ESE lightning protection technology. In making that determination, the Standards Council will act in good faith, fairly and without bias, giving due consideration to the criteria customarily applied in the past in issuing other NFPA standards. Among the criteria for the Standards Council to apply when making its determination, is whether ESE lightning protection technology is scientifically and technically sound, promotes creativity and innovation in the development of new methods and technologies, and whether draft NFPA 781 [as modified in accordance with another provision of the Settlement Agreement] constitutes a reasonable standard intended to minimize the possibility and effect of fire and related hazards. The Standards Council, in examining this matter, shall conduct a *de novo* review, reweighing and considering all evidence anew. (Settlement Agreement at 1, a, p. 3)

In full adherence to the above, and following a review of the entire record before it, the Council has made a determination not to issue an NFPA standard for ESE lightning protection systems and not to initiate further standards development activities at this time aimed at renewed processing of such a standard.

In addressing the alternatives available to it, the Council first notes that a standard on ESE lightning protection systems has never achieved consensus within the NFPA codes and standards development system. (See Standard Council Decision of January 12, 1994, D# 94-11.) Immediate issuance of a proposed standard that had not received the positive recommendation of the NFPA membership would be unprecedented, and although the Council has broad authority, it would only take such an action if very strong reasons were presented for doing so. As will

become clear, the Council has found no basis on which to issue a standard for ESE lightning protection systems.

In the alternative, if the Council believed that a case had now been made that the ESE technology had been validated in a manner that would warrant the development of a separate standard for ESE systems, the Council could direct renewed processing of a proposed NFPA 781 through the NFPA codes and standards development system, either through the assignment of the subject to a new project for ESE lightning protection systems or to a restructured version of the existing lightning protection project. In this regard, principal proponents of a standard for ESE lightning protection systems have suggested a restructured lightning protection project comprising separate "subcommittees" for Faraday and ESE systems. The Council, however, has rejected this alternative as well, because it does not believe that the ESE technology has been sufficiently validated to justify further standards development activities aimed at creating a separate standard for ESE lightning protection systems.

As indicated above, the Council's previous decision in July 1995 not to issue the proposed NFPA 781 and to discontinue the ESE technical committee project was based on the fact that "given the absence of reliable evidence that ESE terminals offer an increased zone of protection over that of conventional terminals, it seems clear that a sound technical basis for proposed 781 has not been demonstrated." (D #95-26) Nothing in the record now before the Council has supplied that reliable evidence or has caused the Council, upon its *de novo* reevaluation of the entire matter, to come to a different conclusion.

In particular, the chief findings of the Bryan Panel Report support the Council's conclusion. Specifically the Panel Report noted that, while ESE air terminals appear to be technically sound in the limited sense that they are generally equivalent to the conventional Franklin Air Terminal in laboratory experiments, the Panel found that the claims of enhanced areas of protection and the essentials of the grounding system have not been validated. Specifically the Panel Report says at page 26:

The ESE lightning protection technology as currently developed in the installation of complete systems does not appear to be scientifically and technically sound in relation to the claimed areas of protection or the essentials of the grounding system.

The report adds on page 27:

There does not appear to be an adequate theoretical basis for the claimed enhanced areas of protection with limited down conductors and grounding system.

Given these findings, which are, in the view of the Council, supported by the record as a whole, the Council does not believe there is any basis to issue a separate standard, such as proposed NFPA 781, for ESE lightning protection systems or to renew standards development activities aimed at creating such a standard. As stressed throughout the lengthy proceedings on this matter, the premise of the proposed ESE standard has always been that ESE systems can operate with

vastly decreased numbers of ESE terminals relative to conventional systems. This premise was, in turn, based on claims of vastly increased areas of protection provided by these terminals. In addition, as the Bryan Panel has pointed out, these systems are premised on limited down conductors and grounding systems compared to conventional systems. As the Panel has found, there simply does not appear to be an adequate basis for the claimed enhanced areas of protection with limited down conductors and grounding systems upon which a proposed separate standard for ESE Lightning Protection Systems has been and continues to be premised. In the absence of a basis for the claims of enhanced protection, it is not appropriate for NFPA to develop a standard premised on such claims.

In sum, although the Council has reviewed this issue anew, based on the entire record currently before it, it has come to similar conclusions as it did when it previously considered this matter in July, 1995. It has concluded that there is no basis at this time for the Council to issue a standard for ESE lightning protection systems. Moreover, given the lack of validation of the primary claims made for the ESE technology, renewed standards development activity toward developing a standard for ESE systems would not, in the view of the Council, be appropriate. As it has said in the past, the Council is not foreclosing future standards development activity should the state of knowledge evolve to justify it. Should that eventuality arise, interested parties should address requests to initiate such a project to the Council.

The above discussion disposes of the question whether to issue a standard for ESE lightning protection systems or to renew standards development activities aimed at developing such a standard. In addition to its conclusions and recommendations relevant to that question, however, the Bryan Panel made additional conclusions and recommendations relating to NFPA's existing lightning protection document, NFPA 780, *Standard for the Installation of Lightning Protection Systems*, and to the technical committee responsible for that document. See Bryan Panel Report at III, C, pages 27 to 29. The Report also makes recommendations for certain "NFPA initiatives" aimed primarily at conducting investigations and obtaining data on lightning strike incidents. See Bryan Panel Report at III, D, pages 29 to 30.

While these recommendations may be worthy of further consideration, the Council notes that, although the Panel could address any issues which "it deemed relevant," the Panel was not specifically charged with addressing these issues. Particularly with respect to the recommendations concerning NFPA 780, there was no reasonable opportunity for interested parties to submit information and views to the Panel on this subject, and the Council, therefore, is reluctant to consider these recommendations at this time. The Council notes, in any event, that NFPA 780 is currently completing a revision cycle and a new edition is about to be presented for motions and debate during the Technical Session on May 17, 2000 of the NFPA World Fire Safety Congress in Denver.

The Council believes that, at a minimum, that process should be completed before considering any issues concerning NFPA 780 or any recommendation the Council might make concerning NFPA staff initiatives related to lightning protection. If, for example, there is a motion to return NFPA 780 to committee which raises issues concerning the validity of the document (as was done in 1995 [see Standards Council decision of July 18, 1995, D#95-25]) or which questions the

appropriateness of designating the document as a Standard, as opposed to a Guide or Recommended Practice, the debate that follows such a motion would be helpful to the Council in considering any further appeals concerning NFPA 780 and the other recommendations made by the Bryan Panel. In conjunction with any appeals or requests it receives, the Council will give consideration to any relevant recommendations in the Bryan Panel Report, as appropriate.

In closing, the Council wishes to thank Dr. Bryan and his co-panelists, Richard Biermann and Glenn Erickson for their willingness to serve on the Panel and for their efforts in preparing the Panel Report, which was of great assistance to the Council. It also wishes to thank all those who made submission to the Panel and who participated in the further proceedings concerning the Panel Report which took place before the Standards Council.