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United States Nuclear Regulatory Commission

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Comment on Draft Reg Guide 1137 - Guidelines for Lightning Protection for Nuclear Power Plants

It is recommended that the Reg Guide address whether or not the use of active lightning protection systems is acceptable, due to their departure from the traditional air terminal approach endorsed by NFPA.

IEEE 998 describes such systems as follows:

6. Active Lightning Terminals:

Three types of such devices have been proposed over the years:

a) Lightning rods with radioactive tips. These devices are said to extend the attractive range of the tip through ionization of the air.

b) Early Streamer Emission (ESE) lightning rods. These devices contain a triggering mechanism that sends high-voltage pulses to the tip of the rod whenever charged clouds appear over the site. This process is said to generate an upward streamer that extends the attractive range of the rod.

c) Lightning prevention devices. These devices enhance the point discharge phenomenon by using an array of needles instead of the single tip of the standard lightning rod. It is said that the space charge generated by the many needles of the array neutralize part of the charge in an approaching cloud and prevent a return stroke to the device, effectively extending the protected area.

There has not been sufficient scientific investigation to demonstrate that the above devices are effective, and since these systems are proprietary, detailed design information is not available. It is left to the design engineer to determine the validity of the claimed performance for such systems. It should be noted that IEEE does not recommend or endorse commercial offerings.

(Ref. IEEE Std 998-1996(R2002) IEEE Guide for Direct Lightning Stroke Shielding of Substations)

The use of active systems is very controversial, as evidenced by a number of lawsuits. In October of 2003, the Federal District Court of Arizona dismissed a suit against the NFPA filed by suppliers of active systems, finding that the suppliers' claims were not supported by tests sufficiently reliable to support those claims. However, industry users are still unclear as to the technical merit of active systems.

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