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The Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Reactor Site Criteria;
Notice of Proposed Rulemaking;
59 Fed. Reg. 52,255 (October 17, 1994)

The American Society of Civil Engineers (ASCE) is pleased to offer these comments on the notice of proposed rulemaking by the Nuclear Regulatory Commission (NRC) that would amend the Commission's reactor siting criteria for nuclear power plants to incorporate the most recent advancements in earthquake engineering.¹

ASCE was founded in 1852 and is the country's oldest engineering organization. It represents more than 115,000 members in private practice, government, industry and academia who are dedicated to the advancement of the science and profession of engineering.

¹ Reactor Site Criteria, Including Seismic and Earthquake Engineering Criteria for Nuclear Power Plants and Proposed Denial of Petition From Free Environment Inc. et al., 59 Fed. Reg. 52,255 (1994) (to be codified at 10 CFR Parts 50, 52 and 100) (proposed Oct. 17, 1994).

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I. BACKGROUND

A. ASCE Standards

Since the early 1980s, ASCE has developed a number of seismic design and engineering standards for various structures, including nuclear power plants. These have become nationally recognized consensus standards intended for use in model building codes. The Society's rules require that our standards committees have a balanced membership among builders, consumers, government and academia, with each group representing between 20 and 40 percent of the committee membership.

Approval or revision of an ASCE standard requires that the following rules be followed:

1. Letter ballots, including abstentions, must represent not less than 65 percent of the approved committee membership.
2. Affirmative votes must represent at least 75 percent of the total affirmative and negative votes cast.
3. Negative ballots must be individually reviewed and resolved or dismissed.

This approval procedure, though time-consuming, assures a consensus standard for model building codes.

Of relevance to the NRC proposal is the seismic-loading standard for use by nuclear power plants that was developed by ASCE.² ASCE Standard 4 is intended to provide rules and

² American Society of Civil Engineers, Seismic Analysis of Safety-Related Nuclear Structures and Commentary on Standard for Seismic Analysis of Safety-Related Nuclear Structures (1986) (hereinafter ASCE Standard 4).

analysis limits that are expected to produce seismic-design responses that have about a 90 percent chance of not being exceeded for a given design earthquake.³ Standard 4 currently is being substantially revised to incorporate the latest seismic engineering criteria. Officials from the NRC's Office of Nuclear Reactor Regulation and Office of Nuclear Regulatory Research are participating in the revision of ASCE Standard 4 through membership on the Society's Committee on Dynamic Analysis of Nuclear Structures.

B. Law and Regulations

The NRC has regulated the siting of nuclear-powered reactors for more than 30 years.⁴ It has established seismic and geologic criteria for the siting of the plants.⁵ The criteria "describe the nature of the investigations required [of the permit applicant] to obtain the geologic and seismic data necessary to determine site suitability and provide reasonable assurance that a nuclear power plant can be constructed and operated...without undue risk to the health and safety of the public."⁶

Part 100 does not require the use of specific seismic design criteria. The Commission describes certain technical design requirements through an internal guidance document, the

³ Id. at v.

⁴ 10 CFR Part 100.

⁵ Id., Appendix A.

⁶ Id.

Standard Review Plan.⁷ Because Part 100 does not mandate an earthquake-resistant design standard for nuclear power plants, the NRC references ASCE Standard 4 in the sections of the Standard Review Plan dealing with seismic engineering parameters.⁸ But the Standard Review Plan does not impose any design or engineering requirements on operators of nuclear power plants either. The Standard Review Plans "are not substitutes for...the Commission's regulations and compliance with [the plans] is not required."⁹

In the present rule, the Commission is proposing to upgrade its siting criteria based on "the rapid advancements in the earth sciences and earthquake engineering."¹⁰ The proposed rule would, among other things, establish the regulatory basis for using applicable earthquake engineering design standards for the construction of new nuclear power plants.¹¹

There are 109 commercial nuclear power reactors now licensed to operate in the continental United States.¹² All of these currently licensed reactors had their construction permits issued between 1960 and 1978.¹³ By 2000, more than 60 of these reactors will be 20

⁷ U.S. Nuclear Regulatory Commission, Standard Review Plan, NUREG-0800 (1989).

⁸ Id. at 3.7.1-10.

⁹ Id. at 3.7.1-1.

¹⁰ 59 Fed. Reg. 52,255.

¹¹ Id. at 52,256.

¹² U.S. Nuclear Regulatory Commission, Information Digest NUREG-1350, 77-89 (1994).

¹³ Id.

years old or older, putting them halfway through their 40-year licensing period.¹⁴ In addition, there are 21 nuclear plants in the U.S. that have been shut down.¹⁵ The proposed NRC reactor site criteria would not apply to these licensed and formerly licensed nuclear power plants.¹⁶

II. COMMENTS

A. ASCE strongly recommends that the NRC incorporate the seismic design and engineering criteria of ASCE Standard 4 into Part 100 to strengthen the basis for the requirements.

The need to engineer nuclear power plants and other critical infrastructure facilities for earthquakes is not limited to those areas of the country like California that experience frequent seismic events. ASCE experts noted nearly a decade ago:

[S]ound, fundamental multidisciplinary procedures should be adopted in areas of the United States where potentially damaging earthquake events will occur, albeit at significantly greater return periods than those associated with [W]est [C]oast earthquakes. Disaster planners in these less seismically active regions of the country should become familiar with the potential for earthquake damage...and adjust already-established disaster-response plans to incorporate a coordinated response to an earthquake disaster.¹⁷

All or parts of 39 states are within zones where there is a high probability of a damaging earthquake. Recent studies indicate that some nuclear power reactors have been subjected to

¹⁴ Id. at 46.

¹⁵ Five of these decommissioned plants are owned by the federal government and are not subject to NRC regulation. Id. at 90-91.

¹⁶ 59 Fed. Reg. 52,255.

¹⁷ James D. Cooper and Michael A. Cassaro, On Preparedness in Regions of Infrequent But Strong Earthquake Activity, in Seismic Design and Construction of Complex Civil Engineering Systems vii (Michael A. Cassaro et al. eds., 1988) (emphasis in original).

a peak ground acceleration of 0.3g to 0.5g during an earthquake.¹⁸ In fact, the NRC has identified at least 50 reactors east of the Rocky Mountains that should undergo a "focused scope" earthquake vulnerability evaluation based on an assumed peak ground acceleration of at least 0.3g and seven other reactors that ought to receive a "full scope" evaluation with an assumed peak ground acceleration level of 0.5g under the Commission's Individual Plant Examination of External Events (IPEEE) program.¹⁹

It is therefore essential that all regulatory agencies adopt and enforce as a matter of law nationally accepted consensus-based standards for seismic design of new buildings and lifelines and, where appropriate, ensure the seismic retrofit of existing buildings and lifelines. The need is especially urgent for the NRC, which regulates nuclear plants that potentially could threaten millions of lives in the event of a catastrophic failure of radioactive fuel and waste containment facilities following an earthquake.

ASCE strongly recommends that the NRC incorporate the seismic design criteria in ASCE Standard 4 into Part 100 itself. The courts, which traditionally give great deference to an executive agency's rulemaking discretion, have held that reliance upon guidance documents and general policy statements as a substitute for regulations is unacceptable. Although it is often

¹⁸ Peter I. Yanev et al., A Summary of the Seismic Qualification Utilities Group Program, in Seismic Experience Data—Nuclear and Other Plants 3 (Yogindra N. Anand ed., 1985).

¹⁹ U.S. Nuclear Regulatory Commission, Procedural and Submittal Guidance for the Individual Plant Examination of External Events for Severe Accident Vulnerabilities NUREG-1407 3.1 (1991).

difficult to distinguish between a rule and a statement of policy,²⁰ the Standard Review Plan by its own terms clearly does not have "a present-day binding effect."²¹ Because of the overriding concern for public safety evidenced by Part 100, the Commission needs to adopt the ASCE Standard 4 design criteria in a substantive rule, i.e., a rule that has a binding effect. The NRC must not only be able to identify the best available engineering criteria, it must be able to enforce them. A general statement of agency policy (like the NRC Standard Review Plan) cannot be enforceable, even in such a critical area of public safety as nuclear power plant engineering, unless it is given "the rigor of a rule, not the pliancy of a policy."²²

Although updating the NRC regulations presumably would add to the work load on the Commission's staff by requiring that Part 100 undergo amendment whenever ASCE revises Standard 4, the actual impact on the Commission's staff would be minimal. For one thing, ASCE upgrades its standards no more than once every five years; this schedule of change would hardly impose an intolerable burden on the NRC. For another, the NRC has substituted regulations for a number of Commission policy statements in the past with no apparent deleterious effect on staff morale or productivity.²³ We believe that the NRC can safely thread

²⁰ See, e.g., Brock v. Cathedral Bluffs Shale Oil Co., 796 F.2d 533, 536-37 (D.C. Cir. 1986).

²¹ Community Nutrition Institute v. Young, 818 F.2d 943, 946 n. 4 (D.C. Cir. 1987).

²² McLouth Steel Products Corp. v. Thomas, 838 F.2d 1317, 1320-21 (D.C. Cir. 1988).

²³ See U.S. Nuclear Regulatory Commission, NRC Policy Statements – Withdrawal, 60 Fed. Reg. 4071 (Jan. 20, 1995) (withdrawing six internal policy statements that had been superseded by official rulemaking actions).

the procedural needle without dropping a stitch. In any event, a marginal increase in the work load of the NRC staff surely must count for little when weighed against the essential public-safety function of Part 100 in preventing undue risk to human life from reactor failures.

B. ASCE encourages the NRC to mandate the retrofit of existing nuclear power plants in extremely active seismic zones with the most recent ASCE seismic design and engineering criteria.

As a threshold matter, we believe that all local, state and federal agencies with jurisdiction over building seismic safety should adopt and enforce design codes that include up-to-date provisions for the seismic engineering of new buildings. In the case of all nuclear power plants, ASCE advocates the development and application of similar nationally accepted consensus-based seismic design standards and we support efforts to require the retrofit of existing buildings.

With 109 aging nuclear-powered reactors now licensed around the country (all of them designed more than a generation ago), and with more than half of them located in potentially active seismic zones, it is important for the NRC to ensure that, at a minimum, those plants located in areas that are most susceptible to earthquakes have their seismic engineering criteria upgraded to match the latest available research.

These new federal engineering and design requirements should be mandated in Part 100 as soon as possible. The requirements should be phased in in a manner to take effect at individual reactors at the time of relicensing to ease the financial impact on the licensees. By adopting the Part 100 criteria now, the NRC would give the industry many years' advance notice of the new standards. By making their practical effective date concomitant with the relicensing

of the reactors and making the standards a condition of relicensing, the NRC would impose the seismic criteria prospectively on the regulated facilities.

Thank you for your attention to these comments. If you have any questions, please do not hesitate to contact Michael Charles of the ASCE Washington Office at (202) 789-2200.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Stafford E. Thornton", with a long horizontal flourish extending to the right.

Stafford E. Thornton, P.E.
President