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ASSOCIATION OF ENGINEERING GEOLOGISTS
"Serving Professionals in Engineering, Environmental and Groundwater Geology"

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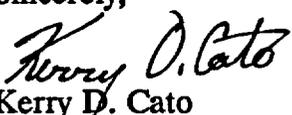
David L. Meyer
Chief
Regulatory Publications Branch
Division of Freedom of Information and Publications Services
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

**Re: Comments by the Association of Engineering Geologists
Nuclear Regulatory Commission - Staff Technical Position
On Consideration Of Fault Displacement Hazards In Geologic Repository Design**

Dear Mr. Meyer:

Transmitted with this letter are comments by the Association of Engineering Geologists (AEG) in response to the above referenced Nuclear Regulatory Commission proposed Staff Technical Position (STP) regarding fault displacement hazards in geologic repository design. In addition to a paper copy of the comments, an electronic copy of the comments is included. On behalf of the AEG, I appreciated the opportunity to review and comment on the proposed rules. The issue of siting and design of geologic repositories, and other important critical facilities, is extremely important. It is essential that appropriate groups of professionals have opportunities to evaluate and respond to proposed regulations governing such facilities.

I trust AEG's comments will be helpful to the NRC staff in completing their important task of protecting the health, safety and welfare of the public through regulations governing geologic repository design. Please feel free to contact me for additional discussion or questions.

Sincerely,

Kerry D. Cato

cc: **AEG President, Dr. Jeffrey R. Keaton**
AEG Seismic Safety Committee

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***NUCLEAR REGULATORY COMMISSION - STAFF TECHNICAL POSITION
ON CONSIDERATION OF FAULT DISPLACEMENT HAZARDS
IN GEOLOGIC REPOSITORY DESIGN***

Comments by the
ASSOCIATION OF ENGINEERING GEOLOGISTS
June 14, 1993

INTRODUCTION

The Association of Engineering Geologists (AEG) is pleased to have an opportunity to participate in the rule making regarding geologic repository design as indicated in the Federal Register of March 18, 1993. The comments presented below constitute the official position of the AEG, and have been prepared jointly by AEG's Engineering Geology Standards Committee and the Seismic Safety Committee. In addition, the comments have been endorsed by AEG President Keaton.

The AEG is a society of approximately 3,000 professional engineering geologists whose work involves the evaluation of geologic conditions on engineering projects. Specifically, much of our work involves the analysis of seismic effects on critical facilities. For many years AEG members have been aware of and utilized NRC regulations; as a result of this familiarity and similar interest it is appropriate for the AEG to offer comments to proposed changes in NRC regulations.

GENERAL COMMENTS

The AEG supports the Staff Technical Position On Consideration Of Fault Displacement Hazards In Geologic Repository Design. The document recognizes several technical aspects pertinent to the design of a critical facility located near a fault or fault zone. The document recognizes that numerous natural seismic and geologic conditions exist and that the characterization should be left to the technical investigator. This is consistent with performance-based regulations which the AEG supports; the professional should be allowed to investigate the fault as deemed appropriate in the field. Another observation is that several portions of the document appear to be left purposefully ambiguous. The AEG concurs that if the document attempted to specifically address every anticipated condition, the document would be extremely long and could in no way address every condition that exists in nature.

Site investigations for critical facilities sometimes discover unexpected and undesirable conditions that could render the site unacceptable. For example, at the North Anna project or the Shearon Harris Nuclear power plant, a fault was discovered close to the site foundation. Subsequent investigations determined that the faults were, "geologically inactive." However, if in the case of a geologic repository such faults were determined to be Type I faults, the STP recognizes that the site is not necessarily disqualified, only that the fault must be better understood and the engineering design factor in the appropriate seismic component. The AEG supports the concept of a thorough investigation rather than an immediate "knee jerk" reaction.

A significant factor in the STP is the recognition that detailed fault investigation has merit. This is directly referred to in the Discussion and also in the Appendix B (Applicable 10 CFR Part 60 Regulations). One recent and disturbing trend in neotectonic studies is the move toward studies which minimize the collection of new data and attempt to rely on reworking of older data. The AEG is steadfastly opposed to any methodology that limits field observation, the collection of new data, both of which form the basis of a thorough investigation. New information in the field of neotectonics, in just the last two years has greatly changed our thinking regarding intraplate seismicity. For example, note the field discovery last year of a major pre-historic earthquake in the Illinois/Indiana Wabash River Valley.

A fault investigation to determine the seismic history and predict future fault activity is basically a scientific investigation. The appropriate application of engineering principles and sound engineering parameters can occur only after thorough scientific work has been performed. The most basic aspect of the scientific method is the formation and testing of a hypothesis. The only way to test these hypotheses is to collect data unique to this particular fault. There are no shortcuts to good scientific investigations.

SPECIFIC COMMENTS

1.0 INTRODUCTION

NRC: *This Staff Technical Position recognized the acceptability of designing the geologic repository to take into account the attendant effects (e.g., displacement) of faults.....*

AEG: *The concept that the presence of an active fault does not by itself automatically force site abandonment is supported by the AEG.*

NRC: *Quaternary-age...The staff has taken the position that, "for regulatory purposes," the age of the Quaternary Period is 2 million years.*

AEG: The age of the Quaternary period has been defined to range from 1.6 to 2.0 million years BP. For example, The Geological Society of America (GSA) defines the Tertiary/Quaternary boundary at 1.6 million years BP. The 400,000 year difference between the GSA and NRC definitions is an extremely long time and has great significance when attempting to determine fault activity. However, from an engineering application, use of the 2 million year BP date is the most conservative approach and the AEG can support this definition.

NRC: *Therefore, DOE should seek early resolution of fault-related design and performance issues, at the staff level, before submitting a license application to construct and operate a geologic repository.*

AEG: The concept of dealing with fault issues early in the design stage, rather than waiting and attempting to "force-fit" a design to an adverse condition is strongly endorsed by the AEG.

1.1 Background

NRC: *Despite recent advances in the treatment of seismic hazards (Bernreuter et al., 1985 and 1989).*

AEG: The concept of "averaging" diverging expert's opinions is highly questioned and the AEG cannot support this methodology.

NRC: *NRC regulations for the disposal of spent nuclear fuel and high-level radioactive waste in a geologic repository, 10 CFR Part 60 (Code of Federal Regulations, Title 10, "Energy") recognize that fault displacement can be a potentially adverse condition (10 CFR 60.122(c)(20)); however, they do not prohibit designing the geologic repository to accommodate the effects of such a potentially adverse condition.*

AEG: The concept that the existence of a fault displacement condition should not automatically rule out a site is endorsed by the AEG.

1.2 STPs as Technical Guidance

NRC: *Methods and solutions differing from those set out in the STPs will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.*

AEG: **As in the spirit of a performance based regulation, the burden of proof is on the investigator. AEG strongly believes that professional judgement should never be taken away from the field investigator.**

3.0 STAFF TECHNICAL POSITIONS

NRC: *(1) It is the NRC staff position that the presence of "Type I" faults, as defined by NUREG-1451, inside the controlled area of a geologic repository, does not, by itself, represent a "disqualifying" feature of the candidate site for a geologic repository.*

AEG: **As stated above, the concept that the existence of a fault displacement condition should not automatically rule out a site is endorsed by the AEG.**

4.0 DISCUSSION

NRC: *(1)...This philosophy requires that if a potentially adverse condition, such as faulting, is present, then DOE is required by the regulations to thoroughly characterize and analyze the condition, and in doing so must demonstrate that the condition can be compensated for by repository design, certain limited engineering measures, and/or by other favorable conditions present at this site.*

AEG: **As similarly stated above, AEG strongly supports site specific thorough characterizations and analysis, rather than a reanalysis of old data or a less site-specific probabilistic study.**