UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

February 14, 1980

Honorable John F. Ahearne
Chairman
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: NUREG-0625, "REPORT OF THE SITING POLICY TASK FORCE"

Dear Dr. Ahearne:

The purpose of this letter is to provide you with ACRS comments on the "Report of the Siting Policy Task Force" (NUREG-0625). In preparing these comments, the Committee had the benefit of discussions with the NRC Staff at a Subcommittee meeting on October 17, 1979 and at the full Committee meeting on January 10-12, 1980.

Siting Goals

In the abstract of the Report it is stated that a number of changes in siting policy have been recommended in order to accomplish the following goals:

1. To strengthen siting as a factor in defense in depth by establishing requirements for site approval that are independent of plant design considerations

2. To take into consideration in siting the risk associated with accidents beyond the design basis (Class 9) by establishing population density and distribution criteria.

3. To require that sites selected will minimize the risk from energy generation.

In connection with the third goal the Siting Policy Task Force states that, "The selected sites should be among the best available in the region where new generating capacity is needed. Siting requirements should be stringent enough to limit the residual risk of reactor operation but not so stringent as to eliminate the nuclear option from large regions of the country. This is because energy generation from any source has its associated risk, with risks from some energy sources being greater than that of the nuclear option."

The ACRS agrees with these goals but has some qualifications which are stated below. It is interesting to note that these goals are, in part, similar and are in part complementary to some siting policy recommendations made by the ACRS in a report* to the Atomic Energy Commission prior to the adoption of 10 CFR Part 100. In that report the ACRS stated the following:

1) Everyone off-site must have a reasonably good chance of not being seriously hurt if an unlikely but credible reactor accident should occur.

2) The exposure of a large segment of society in terms of integrated man-rems should not be such as to cause a significant shortening of the average individual lifetime or a significant genetic damage or a significant increase in leukemia - should a credible reactor accident occur.

3) There should be an advantage to society resulting from locating a plant at the proposed site rather than in a more isolated area.

4) Even if the most serious accident possible (not normally considered credible) should occur, the numbers of people killed should not be catastrophic.

However, the AEC Part 100 Siting Criteria were written so as to provide greater flexibility in the choice of sites than was implicit in these ACRS recommendations and permitted the substitution of engineered safety features for distance. In the decade following adoption of Part 100 in 1962, sites were accepted having surrounding population densities less than or roughly equivalent to that typified by Indian Point Unit 1 which had been approved in 1956. Although the engineered safety features provided in nuclear plants were judged to be sufficient to restrict estimated offsite doses to the specified limits, these estimates were based on the stylized calculations of Part 100 which assumes a large fission product release to an intact containment. Historically, with regard to the engineering design requirements for nuclear power plants located on sites near the borderline of acceptability, the ACRS has recommended additional measures to prevent accidents and to mitigate their effects. In recent years, sites approved for nuclear power plants have had surrounding population densities substantially less than those of Indian Point Unit 1.

With regard to the goals discussed above, the ACRS agrees that siting, as a factor in the defense in depth philosophy, should be strengthened. However, the ACRS believes that any minimum requirements for parameters such as the exclusion zone radius, surrounding population density, or distance from population centers should be established, if possible, within the framework of an overall Nuclear Regulatory Commission safety philosophy for future reactors.

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* ACRS letter to the Honorable John A. McCone, Chairman, USAEC dated October 22, 1960, Subject: REACTOR SITE CRITERIA

Such a philosophy should be based on preestablished Commission objectives for acceptable risk both to individuals and society. This will, of necessity, include consideration of matters such as the potential effects of a broad spectrum of reactor accidents, the identification of an ALARA criterion for the reduction of risk from accidents, and a general statement of policy concerning the objectives to be sought in reactor design with regard to the prevention and the mitigation of accidents.

The establishment of demographic-related site criteria will inevitably require a considerable amount of judgment. However, the choice will be less arbitrary if made within the framework of an overall NRC safety policy. The ACRS believes that an overall NRC safety philosophy is also needed in connection with the third objective of the Task Force, namely that of selecting sites to minimize the risk from the utilization of electricity generating sources.

The ACRS believes that well-founded nuclear power plant siting policy and practice are a national as well as a regional need. The Committee suggests that as part of a broad approach to LWR siting, the NRC should explore the possible development of a nationwide program to identify a bank of near-optimal sites regionally distributed for various types of energy-generating plants. By combining considerations of acceptable risk, the risks from various energy sources, and the national needs for energy, together with other relevant factors, a better long-term basis for determining appropriate criteria for LWR siting should be possible. In the absence of such a broad approach, the ACRS recommends that changes to past siting policy be interim in nature and be designed primarily to provide an acceptable basis for near-term decision making.

Task Force Recommendations

The Siting Policy Task Force has made nine recommendations, each of which is followed by a discussion which elaborates on the recommendation, frequently suggesting specific parameters and occasionally a significant additional recommendation. In this report the ACRS will deal primarily with the recommendations themselves, unless otherwise stated.

Recommendation 1

This is the principal recommendation of the Report. It proposes that Part 100 be revised to change the way in which protection is provided for accidents. The recommendation is very general in form and requires the addition of specifics to be meaningful.

Part 1 of the recommendation proposes the specification of a fixed minimum exclusion distance based on limiting the individual risk from design basis accidents. The ACRS believes that the specification of a minimum exclusion distance should include consideration of the risk from all accidents, not just design basis accidents. It should include consideration of the number of reactors at the site. Any long-term criterion concerning a minimum exclusion distance would best be established within the framework of a general NRC policy on LWR safety. Interim guidance could be determined with the benefit of information developed from NRC Staff studies and information submitted during a proposed rulemaking on interim changes in the site criteria.

Part 2 of the recommendation proposes a fixed minimum emergency planning distance of ten miles. The ACRS generally supports this recommendation with the understanding that appropriate attention would be given to potential problems at greater distances.

Part 3 recommends the incorporation of specific population density and distribution limits that are dependent on the average population of the region. The ACRS believes the wording of this recommendation is vague and it could be interpreted to be excessively restrictive or very permissive with regard to demographic requirements. Additional information is needed to establish interim criteria of this sort within the context of an NRC rule. Among the factors which require consideration are the following:

(a) If some regions of the country are permitted to employ higher maximum population densities, should there be any additional requirements for such plants in design, operation, or emergency planning? If not, what basis will be provided for designating regionally dependent acceptable risks?

(b) Should the NRC place a similar or a substantially greater emphasis on improbable, large accidents in its siting (and design) requirements than is utilized for other new societal activities posing hazards similar in magnitude and probability?

(c) How should the effectiveness of emergency measures, such as evacuation, sheltering and decontamination, be ascertained and factored into a judgment concerning minimum exclusion and emergency planning distances?

(d) Should meteorology not be given consideration in regard to the development of siting criteria?

Part 4 recommends removal of the requirement to calculate radiation doses as a means of establishing minimum exclusion distances and low population zones. The ACRS agrees with the Task Force that the approach used for the past two decades has not provided enough emphasis on site isolation. The Committee believes that the emphasis on engineered safety features to meet Part 100 for the postulated accident without direct consideration of other, more serious possibilities has led to a less-than-optimum approach to safety. However, if the recommendation of Part 4 is adopted, some alternative means of determining the need and adequacy of engineered safety features will be required.

In summary, although the ACRS agrees that the specification of minimum exclusion and emergency planning distances and population density and distribution limits is a commendable objective, and that interim criteria should be developed, the Committee believes that the adequacy of such parameters will depend on the safety related design and operational requirements and on the effectiveness of emergency measures. Also, the ACRS believes the establishment of such parameters involves the assumption of some accepted band of risk which should be specified. While the ACRS is not opposed to removal of the Part 100 requirement for calculation of radiation doses or to the specification of regionally dependent acceptable population densities, the Committee believes these matters need in-depth evaluation.

Recommendation 2

This recommendation proposes minimum standoff distances for potential hazards posed by man-made activities and natural characteristics. The Committee believes that such a recommendation is appropriate but the list is incomplete. For example, LNG terminals are included but not LPG. Similarly, hazardous cargo on rivers is not mentioned.

In addition, the proposed approach lacks an adequate rationale for specific numbers suggested. A distance of at least 12.5 miles from all capable faults, with no distinction as to fault size, is proposed, as is a specification that no reactor sites located on a flood plain should be closer than five miles downstream of a major dam. The reason why either of these two proposed numbers is suitable is not clear to the ACRS. For example, dams many miles away could be equally or more dangerous to a nuclear plant; on the other hand, small capable faults nearer than 12.5 miles might not pose significant design problems.

It is noted that the recommendation does not provide standoff distances between nuclear plants. The potential adverse influence of one plant on its neighbors in the event of a serious accident requires consideration in design.

Recommendation 3

This recommendation would change Part 100 to require reasonable assurance that interdictive measures are possible to limit groundwater contamination resulting from Class 9 accidents. The ACRS supports the recommendation. However, the Committee notes that the current wording is subject to a range of interpretations which could include, for example, the necessity for developing interdictive measures for particulate fallout or rainout that could result in groundwater contamination. The Committee recommends that the wording of the recommendation be made more explicit.

Recommendation 4

This recommendation is very general, merely stating that Appendix A to 10 CFR 100 should be revised to better reflect the evolving technology in assessing seismic hazards.

However, in the discussion section, the Task Force recommends that specific guidance be removed from Appendix A and placed in Regulatory Guides.

The ACRS agrees that the NRC criteria for seismic siting should be revised and perhaps expanded. This clearly will require changes in Appendix A. The ACRS believes that Regulatory Guides can be used to provide increased guidance on the interpretation and application of the criteria.

The ACRS has in the past worked closely with the NRC Staff on the development of seismic siting criteria, and expects to continue to do so in the future and to provide comments on the specific changes as they are developed and proposed. At this time, however, the ACRS cannot agree that all specific guidance can be removed from the criteria, in the absence of a quantitative safety goal.

Recommendation 5

This recommendation relates to post-licensing changes in offsite activities but does not specify what population/time period would be used. For example, would it be the present population, that at the projected end of life of the plant, or an average over the time period during which the plant will be operated? This should be clarified. The recommendation also does not specify what is considered to be a "significant increase in risk." Another consideration that might be taken into account is the nature and use of the land surrounding a site. Whether neighboring land is used for residential or industrial purposes, and whether it is fertile land or a desert, could also be important.

Recommendation 6

This recommendation pertains to methods for compensating for unfavorable site characteristics. The Committee suggests that the phrase, "unfavorable characteristics requiring unique or unusual design," be clarified. Many characteristics that are "unfavorable" can be readily compensated for by design, including some of an "unusual" nature. Design features to provide permanent site improvements should be permissible when suitably reliable. Perhaps these problems could be solved by deleting the word, "unfavorable," and substituting the word, "unproven," for "unique or unusual".

Recommendation 7

This recommendation relates to the timing of site reviews. The ACRS suggests that this recommendation could be improved by substituting the word "decision" for "approach" (in the third line).

Recommendation 8

This recommendation relates to the role of a state agency in approving a site for a nuclear power plant. The ACRS has no comments on this item.

Recommendation 9

This recommendation is to develop common bases for comparing the risks from all external events. The ACRS supports the general concept and would, if practical, extend it to internal events as well. The Committee believes that this concept represents a good long range goal; however, recognizing the complexity of the task, the Committee recommends that priority be given to those areas thought either to introduce the greatest risk or to provide the best opportunities for improvements in safety.

The Committee will be pleased to discuss the above items with you if you desire. In the meantime, we trust these comments will be helpful to you and the NRC Staff.

Sincerely,

Milton S. Plesset

Milton S. Plesset
Chairman