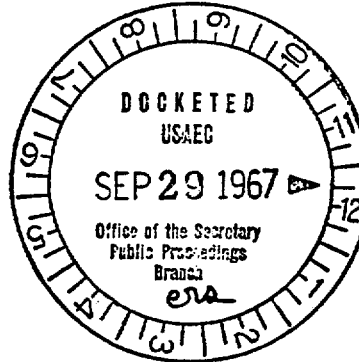


AI**ATOMICS INTERNATIONAL***A Division of North American Rockwell Corporation*ECN 100-100000
PROPOSED RULE **PR-50***Gen. Design Criteria*

September 25, 1967

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Secretary
U. S. Atomic Energy Commission
Washington, D.C. 20545

*In reply refer—***67AT-5374**

Gentlemen:

The revised set of proposed General Design Criteria, which were published in the Federal Register on July 11, 1967, for public comment, represents the results of a great deal of very fruitful effort to develop standards to assist in the preparation of applications for nuclear power plant construction permits. The early release of the first set of criteria developed by the regulatory staff, with the request for comments, initiated the extensive efforts recognized as necessary for effective evolution and development of the criteria. These resulting criteria, which reflect the public comments and suggestions, represent a significant improvement, both in organization and format and in content, over the initial criteria published in 1965. They offer considerably more and better guidance for the preparation of applications for nuclear power plant construction permits and operating licenses.

Our review has resulted in a number of comments and recommendations which are outlined below. Our more general comments are followed by those specifically directed to the individual criteria by number.

First we recommend that in adoption of the proposed criteria as a part of 10 CFR 50, they be more specifically directed to and required of large pressurized and boiling water reactors. This approach in the application would reduce the possibility of ritualistic adherence by reviewers to the requirements of the criteria when considering reactor types other than those for which the criteria were specifically developed. Detailed implementation of the criteria for other reactor types, and particularly for the advanced reactors now receiving major attention, can then proceed in whatever manner is most appropriate for the reactor without preconceived conclusions from the results of application to the water reactors. Also this more specific application to water reactors will reduce the possibility of their misuse by intervenors in public hearings for other reactor types.

The proposed criteria appear to be extremely qualitative in a number of areas. For example, we note the use of words and phrases such as: "impairing of safety" (Criterion 4), "acceptable fuel damage limits" (Criteria 6 and 14), "appropriate margins" (Criterion 6), "exceedingly low probability" (Criterion 9), "high functional reliability" (Criteria 19 and 38), "sufficient" (Criterion 20), "necessary" (Criterion 20), "considerable margin" (Criterion 32), "limited allowances" (Criterion 33), "abundant" and "negligible" (Criterion 44), "considerable margin" (Criterion 49), "as close to design as practicable" (Criteria 61 and 65), "reliable" (Criterion 67), "undue amounts" (Criterion 69), and "high population density for very large cities" (Criterion 70). While we recognize that development of effective definitions of these types of terms is a very difficult task, we wish to encourage a strong continuing effort to define the terms quantitatively and then to include a section on definitions as an integral part of the criteria.

Our specific comments on the individual criteria are identified below by each criterion number.

2. Some quite specific criteria have been developed and applied to such natural phenomena as tornadoes and earthquakes in previous reactor application reviews. Including examples of this kind of guidance would be helpful to applicants. We also recommend that, in addition to the two items cited, the design bases established as a result of this criterion reflect the results of analyses which include not only the quantitative severity of the natural phenomena but also their probability of occurrence.
4. The implication that any degradation or impairment of safety is unacceptable and should be removed.
5. It might be noted that the records should be accessible subsequent to the occurrence of an accident.
8. We believe that it is unnecessary to require the overall power coefficient to be not positive in the power operating range. It is quite possible for the overall coefficient to be positive, and there be no unacceptable safety problem. For example, in a sodium graphite reactor, the coefficient has a prompt negative component together with a positive component with a long time constant. This results in an overall positive coefficient, but the negative portion of the coefficient is large enough and fast enough to assure

satisfactory control and safety. In fact, the lack of an overall negative coefficient is an advantage, since compensation for a large temperature and power defect in the reactivity is not required.

10. It is entirely conceivable that containment, as used today for water reactors, may not be required for other types of reactors currently under development. It would seem appropriate to give some recognition now to this in this criterion.
11. The basic requirement here is the provision of a control room that will remain habitable and will provide capability to shut the reactor down and maintain it in a safe condition. Application of the radiation exposure limits in 10 CFR 20 in this criterion is unduly stringent and is unnecessary. The 10 CFR 20 limits are for normal operations and should not be required in "accident conditions."
13. The requirement for monitoring the fission process for "... all conditions that can ... cause variations in reactivity" is too inclusive in this context. The examples given are simple and of external origin. More subtle conditions could be, e.g., fuel motion during life, changes in core geometry, etc. It may not be possible to monitor these conditions directly. What is important is monitoring of reactivity, and a predictive analysis by means of which observations and predictions can be compared, and any anomalies identified.
14. We submit that it is unnecessary for all core protection systems "to act automatically."
16. This criterion should require monitoring for leakage of reactor coolant; monitoring the "reactor coolant pressure boundary" is unnecessary.
20. The bases for determining when two different operating principles are necessary should be included here.
28. It is not necessary for two reactivity control systems to act fast enough to prevent exceeding acceptable fuel damage. Hence, we recommend deletion of "... including those resulting from power changes, sufficiently fast to prevent exceeding acceptable fuel damage limits."

29. Shutdown margins greater than the worth of the most effective control rod appear inconsistent with the fact that reactors now being licensed have in excess of 100 such rods. We suggest the criterion be directed to providing shutdown margins greater than the maximum worth of any one gang of rods which can be driven or controlled by an operator or the control system.
36. We would point out that, except for financial risk, the requirements of this criterion are unnecessary if failure of the coolant boundary does not result in loss of coolant and subsequent core failure. Hence, application of this to low pressure coolant systems can be relaxed significantly.
39. Requirements for offsite power should be deleted, since adequate onsite power systems must always be required for emergency operation of the engineered safety features.
42. Here, it should be recognized that the loss-of-coolant accidents may not be design basis accidents for other power reactors for which these criteria are generally applicable.
44. We believe that the extent of independence and redundancy outlined here for the emergency core cooling systems is not necessary for low pressure systems. Also we question the necessity for "preferably of different design principles."
66. The second sentence should be replaced with "Inherent means should be used where practicable."
67. The criterion should be revised to require the design to be based on preventing exposures in excess of 10 CFR 20 limits.
69. The criterion should require that containment be provided if radioactivity releases due to accidents lead to public exposure in excess of 10 CFR 20 limits.

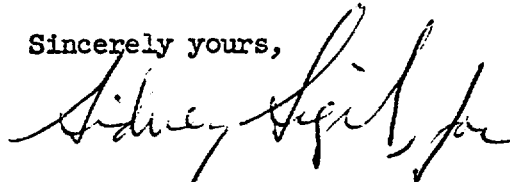
Secretary
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67AT-5374

We believe your consideration of our comments will lead to further improvements in the General Design Criteria. If there are questions, or if we can provide further clarification, we shall be pleased to do so.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "J. J. Flaherty".

J. J. Flaherty
President
Atomics/International Division