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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
UNITED STATES ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

January 27, 1961

MEMORANDUM

To : ACRS Members

From : C. Rogers McCullough (Sgd.) C. Rogers McCullough

Subject: SITE CRITERIA -- COMMENTS ON THE DRAFT OF 1/17/61

Page 1, line 4. It is a fact that the proposed rule making of May 23, 1959, did specify that the site criteria were for power and testing reactors. In my opinion any general criteria should be applicable to sites for all reactors. I believe, further, that any quantitative values for semi-general application are only applicable to power reactors. I believe it is most important to preserve different criteria for testing reactors than for power reactors. However, since this first paragraph is historical, no changes should be made in that part.

Page 1. Insert a paragraph after the first paragraph.

> "The general criteria for the location of reactors are applicable to all kinds of reactors. However, at this time it appears that quantitative criteria can be given only for power reactors of a type and design on which experience has been developed."

Page 1, line 17 and following. I would prefer the following wording:

> "Moreover, the inherent characteristics and the specifically designed safeguard features of the reactor are of paramount importance in reducing the possibility and consequences of accidents which might result in release of radioactive materials. All these features of the reactor and its actual purpose and method of operation must be considered in determining whether location of a proposed reactor at any specific site does, in fact, provide for adequate protection of the health and safety of the surrounding population. It is highly desirable that reactor designers and operators be encouraged to provide to the fullest extent possible reliability and safety of design and operation of the reactor."

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Page 2, (b).

"Even if the maximum potential release of radioactive material from the reactor (not considered credible for the type of power reactors being considered in these quantitative criteria) should occur, the natural protective features of the location or the thoroughly proven safe construction methods (for example, underground) should prevent killing a catastrophic number of people."

Page 2, (c), line 14. Insert "the integrated" before the word "total."

Page 2, (c), line 15. After the word "dose" insert "(man-rem)".

Page 2, (c), last sentence. Add:

"Pending the completion of the study of ways to give proper consideration of the integrated exposure of large numbers of people to varying and generally low doses of radiation, the distances to modest and large concentrations of people will have to be modified from those used as examples in the guides in accordance with the actual conditions existing at the proposed locations."

Page 4, line 3. Delete "power and testing" and add, in line 4, at the end of the sentence:

"These criteria are applicable only to power reactors of a type and design on which experience has been developed."

Page 4, line 12. Delete "and testing" and add to the sentence "of a type and design on which experience has been developed."

Page 4, line 16. To the sentence ending with "reactors" add "giving full recognization to the actual design, construction, purpose and method of operation proposed for the reactor."

Page 5, line 16. Insert after the end of the line "and their concentration."

Page 5, (c). At the end of this paragraph insert the sentence:

"Due consideration will be given to the actual population distribution,and modifications may be made in the appropriate distance even if the number of residents in the densely populated center is somewhat different than the number of 25,000."

Page 6. Delete section "e" on testing reactor.

Page 7, (a), line 3. After "low population zone" replace present wording by "and the number and distribution of persons residing outside of the low population zone particularly if they are concentrated into densely populated areas."

Page 8, line 1. Delete "and testing."

Page 8, line 9. Add:

> "Applicants should be encouraged to provide safeguards against accident and release of radioactive materials, in depth, of well proven reliable design."

Page 9, line 15. Replace "300 rem" by "150 rem."

Page 9, line 22. Replace "300 rem" by "150 rem."

Page 10, (3). At the end of this paragraph add the sentence:

> "Consideration should be given to the total integrated radiation dose which might be given to the population in the event of an accident and adjustments will be made accordingly, particularly as a result of the further study to be carried out by the Commission."

Page 10, line 13. Change "300 rem" to "150 rem."

Page 10, line 18. After line 18 add the sentences:

> "In this example, no credit has been allowed for means of reducing the source strength of the cloud of radioactive material within the containment vessel. The applicant may be able to show that he has provided reliable means of reducing the amount of particular isotopes or all of the fission products materially below the arbitrary release which is given. If this can, indeed, be shown, credit would be allowed accordingly."

Page 11. The table should be modified to allow for a source strength of 100% of the noble gases, 100% of the halogens, 100% of the tritium; 100% of the cesium; 100% of ruthenium, 3% of the strontium, 6% of the barium, 0.3% of the rare earths, and 0.3% of the plutonium. An alternative is to allow for reduction factors by virtue of the reduction of the pressure, scrubbing of sprays, filters, etc.

Page 11, 2.b., and Page 12. Change to read:

"The release of the radioactivity from the reactor building to the environment should be at a leak rate to be specified by the applicant. Any distance calculation should be based on this specified leak rate which the applicant is prepared to guarantee, for example, calculation using an arbitrarily selected 0.1% per day at the design pressure of the containment. The applicant should be permitted to use the actual pressure within the containment vessel which he can demonstrate. In the example calculation used, no reduction in the pressure was used and the calculation assumed that the release was continued until the iodine had decayed away."

Page 12. Don Pack has a correction for the formula.

The data on Pages 14 and 15 will require correction.