

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of
OFFSHORE POWER SYSTEMS
(Floating Nuclear Power
Plants)

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Docket No. STN 50-437

BRIEF OF THE UNION OF CONCERNED SCIENTISTS,
AMICUS CURIAE

Summary and Introduction

The Commission has accepted review of the following question certified to it by the Appeal Board in ALAB-500: whether Class 9 accidents are a proper subject for consideration in the staff's environmental statement on the floating nuclear power plant application. In its Order of December 8, 1978, the Commission invited the participation of amici curiae in this review and permitted amicus briefs to be submitted which support, oppose or take no position on the certified question. In response to the Commission's invitation, the Union of Concerned Scientists ("UCS") has prepared this brief.

UCS believes that the result reached in ALAB-489 was the correct one; that is, that the environmental review done for the OPS proceeding should include an evaluation of the probability and consequence of Class 9 accidents. UCS will not present argument here on the merits of the specific reasoning adopted by the Appeal Board in ALAB-489, but will instead

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present an alternative argument supporting the result reached. This should not be taken as expressing either disagreement or agreement with the rationale of ALAB-489.

UCS' position, briefly stated, is that the Commission lacks a technically defensible basis for unsupported statements in the Annex to Appendix D of 10 CFR Part 50 that the probability of the occurrence of Class 9 accidents is "so small that their environmental risk is extremely low" The only arguably scientific support for such a conclusion was the Reactor Safety Study -- WASH-1400 -- and its conclusions with regard to this issue have been fatally undermined by the recently published Report of the Risk Assessment Review Group, NUREG/CR-0400. In the absence of a rationally supportable method of classifying some accident sequences as "incredible," and in advance of a rulemaking proceeding to amend the Annex,^{1/} the appropriate course of action for the Commission to follow is to permit the issue of Class 9 accidents to be raised on a case-by-case basis, as it did with the issue of the environmental effects of radon.

In addition, we will argue that, as a matter of law, the interim Annex cannot serve as a basis for excluding the consideration of Class 9 accidents. The Annex is not a rule;

^{1/} It should be noted that UCS has submitted to the Commission a "Draft NRC Statement of Policy Concerning Reactor Safety Study and Notice of Intention to Promulgate Regulations," attached to a letter of November 1, 1978, to the Commissioners. We believe that the proposed rulemaking discussed in that document provides a reasonable basis for dealing with this issue generically.

at most it is an interim statement of policy promulgated and maintained without the requisites of administrative due process which attach to rulemaking and adjudication. Therefore, the factual basis and conclusions of the Annex are open to challenge in licensing proceedings.

Argument

1. The Exclusion of Class 9 Accidents from Consideration on the Basis of the Annex is Technically Indefensible.

Since 1971, the AEC and then the NRC have followed the practice of disregarding the potentially enormous environmental effects of a "catastrophic" reactor accident (breach of containment or core melt) on the grounds that the probability of such an accident occurring is so remote as to be essentially incredible. The slim reed upon which this regulatory position is based is found in the proposed Annex to Appendix D of 10 CFR part 50 which has had the status of an "interim" policy statement for seven (7) years. The Annex neither contains nor references any technical support for the conclusion that the probability of a Class 9 accident is "remote," nor does the Annex provide a quantitative equivalent of the terms, "so small," or, "sufficiently remote." Hence, the Appeal Board's characterization of the Annex is appropriate: the likelihood of a Class 9 occurrence "is deemed highly improbable . . ." (ALAB-489, 8 NRC 194, 209 (August, 1978.) Emphasis added.)

The Reactor Safety Study ("RSS") was undertaken by the AEC in 1972 for the critically important purpose of establishing a solid, scientific basis for the Commission's claims about the safety of nuclear reactors. While the AEC claimed, as in the Annex, that its regulatory policies of defense-in-depth, quality assurance,^{2/} maintenance and testing, and conservative design, resulted in an extremely low probability of catastrophic accident, it had no documented estimates of accident probabilities or of the overall level of risk posed by the commercial nuclear plants it licensed.

Dr. Peter Morris, then Director of the AEC's Division of Reactor Licensing, stated in an April, 1972, memorandum:

Associating technically defensible probabilities with Class 9 accidents [a major accident involving large radiation releases] is not possible at this time. To develop a basis for this is, and has been, the subject of much discussion among the top Regulatory Staff and a very substantial technical effort over a considerable length of time. ^{3/}

Dr. Stephen H. Hanauer, Technical Advisor to the Director of Regulation at the time, wrote a set of notes on the RSS proposal in March of 1972 that summed up the pre-RSS predicament of the AEC. All that could be done in justifying the

^{2/} The staff has lately conceded in another context that the strict quality assurance requirements of 10 CFR Part 50, Appendix B were not applied to the vast majority of reactors in operation -- all of those which received construction permits prior to July 27, 1970. To these plants, only the "rather general" provisions of Appendix A, GDC-1, were applied. See, Memorandum from Harold R. Denton to the Commissioners, "Union of Concerned Scientists' Petition for Reconsideration Dated May 2, 1978," August 31, 1978, Enclosure 1, pp. 5-6.

^{3/} Peter Morris, "Federal Agency Comments on Accident Analysis." AEC internal memorandum, April, 1972.

licensing of nuclear plants while the RSS was "perking along" was just to "wave arms and talk loud."^{4/}

It is true, of course, that various safety precautions are taken in many aspects of reactor design, construction and operation. What the AEC was lacking, and what the RSS has intended to provide, was a definitive scientific assessment of the level of safety achieved by these safety-related efforts. There was and is no scientific controversy about the fact that the potential consequences of uncontrolled reactor accidents, direct and indirect, are so great that it would be imprudent to build plants, especially near populated areas, unless convincing assurance is available that the actual risk is very low. The RSS was an attempt to demonstrate this point -- the only systematic attempt the AEC or the NRC has ever undertaken. The undermining of critical portions of the RSS as a consequence of the Risk Assessment Review Group Report leaves the Commission with no technical basis for concluding that the probability of a Class 9 accident is so remote as to justify the Annex's direction that the consequences of such accidents be excluded from review.

The Risk Assessment Review Group was composed of a panel of scientists established by the NRC in July, 1977, to review WASH-1400 and its growing body of peer criticism. The final

^{4/} Stephen H. Hanauer, "Notes on MIT Study Proposal," AEC Internal memorandum, March 22, 1972.

report of the group, NUREG/CR-0400, was published in September, 1978. It concludes, inter alia, that, although the methodology of WASH-1400 may in certain limited instances be usefully employed, particularly as an indication of areas requiring research priority, the quantitative risk assessment provided in WASH-1400 is technically indefensible. This is due in many cases to an inadequate data base, in others to a failure to quantify common cause accidents, and finally to the use of some unjustifiable methodological and statistical techniques, among other reasons. The Risk Assessment Review Group recommends a number of steps. Among the most significant are that neither the absolute risk figures nor the consequence model from WASH-1400 be used uncritically in the regulatory process.

The RSS does not provide a valid scientific assessment of the safety of nuclear power reactors. WASH-1400 is defective in many significant ways. Many of the calculations are wrong, and the absolute risk figures are not reliable. WASH-1400 does not support the conclusion that the probability of a Class 9 accident is so remote as to be incredible for regulatory purposes.

Tacitly, the staff has recognized the indefensibility of the Annex's absolutist public position on Class 9 accidents. Indeed, it maintained before the Appeal Board that its interpretation of the siting guidelines of Part 100, as expressed

in the Standard Review Plan ("SRP"), should have made it clear to applicants that a highly populated proposed site could be rejected solely because of the potential population exposures which might result from a Class 9 accident. (See, ALAB-489, supra, at 223-223). As the Appeal Board noted, the circumspect, virtually "code" language of the SRP makes no use of the terms "Class 9 accidents," "core-melt," or "accidents beyond the design basis." (Id., n. 107 p. 224).

While the Appeal Board was concerned that such obfuscation might result in a failure to fairly inform applicants of what is required of them, UCS takes a somewhat different view of the matter. In our opinion, both applicants and staff are aware of the way Part 100 is used to reject highly populated sites that would otherwise meet the regulations; it is the public and perhaps even some of the Commissioners who have not been provided with the key to the code. UCS believes that the staff should continue to reject highly populated sites but that it should clearly and publicly acknowledge that it does so based upon a consideration of the consequences of Class 9 accidents. It should also acknowledge that the Annex's exclusion of such events from environmental review is incongruous and technically unjustifiable.

We include for the Commission's consideration a copy of a memorandum and attachments released to UCS pursuant to a Freedom of Information request. The memorandum, dated April 18,

1975, from Stephen H. Hanauer to Edsor C. Case, Deputy Director, Office of Nuclear Reactor Regulation, provides comments on various proposed alternative regulatory methods for dealing with core melt accidents for the floating nuclear plant.^{5/} Dr. Hanauer stated:

CORE MELT CONSIDERATIONS FOR FLOATING NUCLEAR
POWER PLANTS

While I agree with you that Alternative 1 is untenable, I do not think that the issue you raise can be considered solely within the four corners of the floating plant question. True, we might do as the lawyers suggest and try to treat floating plants specially because of the lack of experience, but this does not seem to me to be a correct position. Moreover, I do not believe that your proposed Alternative 4 really solves the problem.

The licensability of the floating plant depends, it seems to me, on two decisions: (1) Whether the plant -- reactor platform, moorings, breakwater, etc. -- are adequately designed, and (2) Whether it is alright to put this sort of machine out in the water near the coast.

If only design basis accidents are considered, and if such problems as breakwaters and ship collisions are properly resolved, there is no difference in concept between land reactor safety and floating reactor safety. But this is not be any means the first time that such questions have affected reactor licensing. Indeed, if only design basis accidents and the words of Part 100 are considered, we would allow plants to be built in Burlington for sure, and probably at Edgar and Ravenswood. Yet all these three sites were rejected because they are too close to large populations. One of the rationales for this was the unlikelihood of successful evacuation of large dense populations. However, behind this was another consideration in the backs of everybody's

^{5/} UCS does not presently have a copy of either Enclosure 1 to Dr. Hanauer's memorandum or the document describing the alternatives which Dr. Hanauer was commenting on, although they should, of course, be accessible to the Commission. UCS recommends that they also be made accessible to the public.

minds that very large accidents are possible and that their possibility, even though they are very improbable, dictates keeping reactors out of highly populated areas.

I believe that the ACRS is correct in asking the FNP applicant to consider accidents worse than the design basis. I believe that NRC should also develop an adequate appreciation whether bad accidents (outside the design basis) would be 'catastrophic' in the FNP. Now, unfortunately, I don't have a good definition for 'catastrophic' or a good definition how low the probability should be before I am willing to accept a 'catastrophic.' Ideally, one would have at least a comparative Rasmussen-like study. In the real world, this is some time off.

Dr. Hanauer's memorandum supports the UCS argument that the Annex's treatment of Class 9 accidents is insupportable and that the staff's actions have recognized as much. This may have special significance in the OPS case insofar as it illuminates the point that the consequences portion of the risk equation is constantly shifting, depending on site-specific factors. Analysis of the consequences of Class 9 accidents in the context of Part 100 is already done on a case-by-case basis, reflecting the tremendous difference that site-specific characteristics, primarily of population density and distribution, can make on the calculation of consequences.

It may be suggested to the Commission that it should resolve this dilemma by repudiating the staff's interpretation of Part 100 and thus removing any consideration of Class 9 accidents from the licensing process. That would be a

disastrous irony, and we urge the Commission to reject any such invitation to hide its head in the sand. Rather, the Commission should now affirm that the excessively prolonged period of relying on the "interim" Annex to shut off NEPA review of the risks of Class 9 accidents is ended and allow these issues to be explored on a case-by-case basis pending generic resolution

2. The Exclusion of Class 9 Accidents from Consideration on the Basis of the Interim Annex is Legally Indefensible.

Both the majority and the dissent in ALAB-489 rely on the policy purported to have been established when the Annex to Appendix D of 10 CFR Part 50 was published as part of a proposed rule. (36 FR 22851-52, December 1, 1971). Only by finding that the risks of Class 9 accidents at floating nuclear plants had not been considered at the time the Annex was published does the majority reach the conclusion that the Class 9 accidents must be considered here. While the result in this case is correct, reliance on the Annex for the proposition that Class 9 accidents need not and may not be considered is misplaced. The Annex is nothing more than an unsupported statement of what the Commission once proposed as a policy but never adopted. It is not a regulation, and it is not binding on any of the parties, including the Commission.

As the majority explained,^{6/} the Annex was part of a

^{6/} ALAB-489, supra, pp. 209-210.

proposed rule for implementing NEPA. When it issued the Annex, the AEC explained that:

The proposed amendments would, by the addition of an Annex to Appendix D, specify certain standardized accident assumptions to be used in Environmental Reports submitted by applicants for construction permits or operating licenses for nuclear power reactors pursuant to Appendix D. The accident assumptions and other provisions of the proposed amendments would also be applicable to AEC draft and final Detailed Statements.

(36 FR 22851. Emphasis added.)

At that time, the Commission apparently understood that it was not yet establishing standardized accident assumptions, and that it had to take further action in order to do so. The Commission also understood that even proposed rules may be useful to the public in indicating the approach that it intends to take:

The Commission expects that the provisions of the proposed amendments will be useful as interim guidance until such time as the Commission takes further action on them.

(Id.)

Since the proposed rule was issued, the Commission has taken no action with respect to the Annex, though it did codify other parts of its NEPA regulations in 1974, at which time it stated that the Annex was "still under consideration," and that its status had not changed. The question, then, is what the Annex was, and what impact, if any, it could have on licensing proceedings.

The answer is that the Annex was simply a general statement

of policy that had no force of law and could have no impact. The fundamental rules of administrative procedure and due process that govern this case were clearly stated in Pacific Gas & Electric Co. v. Federal Power Commission, 506 F. 2d 33, 38 (D.C. Cir. 1974):

An administrative agency has available two methods for formulating policy that will have the force of law. An agency may establish binding policy through rulemaking procedures by which it promulgates substantive rules, or through adjudications which constitute binding precedents. A general statement of policy is the outcome of neither a rulemaking nor an adjudication; it is neither a rule nor a precedent but is merely an announcement to the public of the policy which the agency hopes to implement in future rulemakings or adjudications. A general statement of policy, like a press release, presages an upcoming rulemaking or announces the course which the agency intends to follow in future adjudications.

The Annex has not been made binding either through rulemaking or through binding precedents. It merely states what the Commission intended in 1971 to establish as policy. In the Court's words:

When the agency applies the policy in a particular situation, it must be prepared to support the policy just as if the policy statement had never been issued. An agency cannot escape its responsibility to present evidence and reasoning supporting its substantive rules by announcing binding precedent in the form of a general statement of policy.

(Id. Emphasis added.)

In this particular situation, the question is whether the possibility of a Class 9 accident is so remote that it need not be considered in environmental reviews required by

NEPA. The current evidence, discussed elsewhere in this brief, establishes that there is no rational basis for reaching such a conclusion. However, even assuming that the Appeal Board could reasonably reach that conclusion based on some evidence, it may not do so on the basis of the Annex. Rather, it must consider the factual issue and reach a decision independently of the general statement of policy embodied in the Annex.

The Appeal Board cites three cases to support its reliance on the Annex, Carolina Environmental Study Group v. United States, 510 F. 2d 796 (D.C. Cir. 1975), Porter County Chapter of Izaak Walton League v. Atomic Energy Commission, 533 F. 2d 1011 (7th Cir. 1976), and Ecology Action v. United States Atomic Energy Commission, 492 F.2d 998 (2d Cir. 1974). The latter case is irrelevant because it involves only the question of whether a Commission decision could be appealed and does not involve any substantive issues. The first two do consider the distinction between Class 9 and other types of accidents, but the decision in each case is based explicitly and clearly on the record of that case. For example, in Carolina Environmental Study Group, supra, relied on heavily by the Appeal Board, the petitioners had not introduced any evidence to challenge the conclusions stated in the AEC's environmental impact statement with regard to the remote probability of Class 9 accidents. Rather, they challenged the basic policy of excluding certain events on probability

alone, without consideration of consequences. The Court held that "there is a point at which the probability of an occurrence may be so low as to render it almost totally unworthy of consideration." (Id., p. 799). The Court was clearly correct in this statement of general principle, and many courts have ruled in similar fashion, articulating the "rule of reason" for NEPA implementation. The Court went on to make it clear that its acceptance of a Class 9 accident as one of such low probability was based solely on the record of that proceeding, consisting of the unchallenged statements of the AEC:

We find nothing in the instant record which would indicate that the AEC findings regarding Class 9 accidents are clearly erroneous

(Id., p. 800. Emphasis added.)

No court has ever held that the interim policy statement contained in the Annex can be used at the threshold to cut off inquiry into the factual basis for or the conclusions expressed in the Annex. Such a ruling would be unthinkable, particularly when the party which seeks to initiate the inquiry is the NRC staff.

We are left, in this case, with a decision based on a proposed rule that has never been issued as a final rule. Since it was merely a proposal made seven years ago, there is no indication of what form it would take if ever finalized. All we know is that the Commission is still "considering" it. As stated by the Court in Wuillamey v. Werblin, 364 F. Supp.

237, 243 (D.N.J. 1973):

A proposed regulation may be modified or abandoned. It does not have the force of law.

Since the Annex, either as a statement of policy or as a proposed rule, does not have the force of law, it cannot be used as the basis for cutting off all inquiry into the risks of Class 9 accidents.

Conclusion

Unlike the Licensing and Appeal Boards, the Commission should not feel itself bound by the words of a 1971 interim policy statement of the AEC which has no basis for continued vitality in fact or in law. There are many grounds, some more narrow than others, upon which the Commission can reach the correct result, which is to allow the parties in the OPS proceeding to develop a record on the risks of Class 9 accidents and the propriety of requiring engineered safeguards to protect the public from these risks. UCS believes that it is not in the best interest of rational regulatory policy for the Commission to adopt a ruling which would leave its adjudicatory boards uncertain about the status of the Annex. In any case, it is clear that the Annex cannot be used in this proceeding as a shield against consideration of a question vital to the Commission's duty to protect public health and safety.

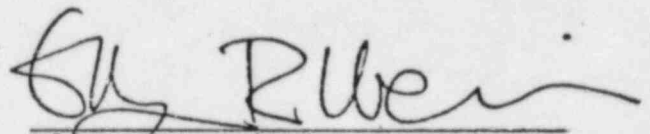
The staff has concluded that new safeguards are required

in the case of a floating nuclear plant, a new concept in reactor siting, to fully protect the public's safety. The Applicant asks you to rule, without hearing any evidence, that mere consideration of such safeguards is precluded by an interim rule which has been languishing for seven years. Such a result is preposterous, and we feel confident that the Commission will reject it.

Respectfully submitted,

The Union of Concerned Scientists

BY:



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DATED: January 12, 1979

CORE MELTDOWN STUDIES

SUBJECTS	POTENTIAL CONTRACTORS	PRIORITY
Vapor Explosion	ANL/Henry ANL/CE Sandia	
Molten Core Act w/ Concrete	Sandia	
Large scale test Fission product Marine dispersion	Naval Surface Weapon Center	
F.P. Transport air	ORNL (ongoing)	

April 18, 1975

Edson G. Case, Deputy Director, Office of Nuclear Reactor Regulation

CORE MELT CONSIDERATIONS FOR FLOATING NUCLEAR POWER PLANTS

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Your Alternative 4 is an attempt to reach some decisions pending the completion of a good safety study for the FNP. I don't see how it can be made viable. Having opened the question about core melt consequences, you can't proceed without an answer in my opinion. The work you propose to get done and the papers you propose to circulate are incomplete, and in a certain way trivial, without an adequate consideration of the core melt problem. I much prefer your Alternative 5 with some rearranged priorities and maybe some intensive work by the applicant. That's what I think Alternative 4 would end up looking like anyway.

There are some other important questions about the floating plant, such as outside power reliability, storms and breakwaters, ship collisions, etc. I think these should be pursued without waiting for the core melt question.

There are lots of plant design details for which a suitable resolution is sure to be available. I question whether doing a lot of work on these at the present time is really worthwhile.

Attached are a draft talking paper on the Rasmussen Study and how it affects Class 9 accidents and also some detailed comments on the materials transmitted to me on March 31st.

Original Signed by
Stephen H. Hanauer
Stephen H. Hanauer
Technical Advisor

Enclosures

1. Dft Talking Paper
re Rasmussen Study
2. Detailed Comments

DETAILED COMMENTS

Page 1 - The frequency discussed here follows from the assumption that about 1,000 reactors are in operation. Some distinction should be made between today with 50 reactors running and A.D. 2000 with 500 to 1,000 reactors running.

Page 2 - One of the lessons of the Rasmussen study is that most core meltdowns do not have drastic consequences. This puts "catastrophes" further down on the probability scale because of their unlikelihood even if the core melts. The discussion here does not make this distinction and therefore fails to learn an important lesson from the Safety study.

Page 4 - The summary in the last half of this page is more simplistic than the facts. The material in the last three lines, and on top of page 5, neglects entirely the sort of considerations that have led to the rejection of proposals to build reactors at Burlington, Ravenswood and Edgar. Thus, while each word of this discussion is true, it fails to take an important factor into account.

Reactors must be shown to be safe in consideration of all possible occurrences. The spectrum of such occurrences ranges from the trivial to the catastrophic. For occurrences within the design basis the consequences must be shown to be tolerable by conservative evaluations. For postulated events outside the design basis the probability must be shown to be low and acceptable and qualitatively depend on whether the probability is low enough in relation to the consequences. The value of the Safety study is just in that it makes these relationships explicit and quantitative.

Page 5 - We have indeed implied that core meltdown frequency is lower than 10^{-6} per reactor year. This problem is discussed in detail in a separate attachment.

Page 8 - Item 3 has to be demonstrated. It has not been so demonstrated yet in a way that is convincing to me.

Page 9 - The basis for Item 4 is not evident to me. Are there evaluations or calculations that show this in any quantitative way? In particular, the discussion of differences in failure mode between ice condenser containment and the containments studied in Wash 1400 should be substituted or deleted. Similarly, Item 5 seems to contain several unacknowledged conjectures.

Page 12 - I agree with you that Alternative 1 is untenable. Even if I thought it was true, I doubt if an acceptable defense of it could be sold to the board, the courts or the public. I do not believe it is true.

Page 13 - I don't see how we could recommend building a small number of plants with this kind of an open question regarding their safety.

Alternative 3 ignores the problem unacceptably and proposes that the staff be an ostrich.

Page 14 - Alternative 4 - I have commented on this at length in my covering memo.

Page 17 - Alternative 5. I think this is the only course and propose that it be done expeditiously instead of slowly as proposed.

Page 18 - Alternative 6 is what happens if you don't do Alternative 5 with considerable speed. I don't know whether lagoons are a viable alternative for a few years.