

UNION OF CONCERNED SCIENTISTS

RELATED CORRESPONDENCE

November 1, 1978

Joseph Hendrie, Chairman
Victor Gilinsky, Commissioner
Richard Kennedy, Commissioner
Peter Bradford, Commissioner
John Ahearne, Commissioner
U.S. Nuclear Regulatory Commission
1717 H Street, N.W.
11th Floor
Washington, D.C. 20555



HAND-DELIVERED

RE: Proposed Statement of Policy Concerning
Reactor Safety Study and Need for Rule-
making Resulting from the Risk Assessment
Review Group Report

Gentlemen:

The Nuclear Regulatory Commission is now reviewing the Risk Assessment Review Group Report on the AEC/NRC Reactor Safety Study (RSS). The Commission's meeting on this subject of Friday, October 13, 1978, was a remarkable manifestation of the near-universal view, among informed and objective students of reactor safety, that the RSS estimates of nuclear accident risks are technically indefensible.

The Union of Concerned Scientists (UCS) believes that the Commission has begun to chart the correct course in its consideration of the meaning and implications of the Risk Assessment Review Group Report. The realization that RSS claims are scientifically invalid should be reflected in a new NRC Policy Statement on the RSS and in a thorough re-thinking of the NRC's use of risk assessment in the regulatory process. This Policy Statement should, of course, contain a withdrawal of the official NRC endorsement given the RSS and its results by Chairmen Anders and Rowden. More importantly, however, the new Policy Statement should address the profound implications for nuclear plant licensing posed by withdrawal of the RSS. These implications were noted on pages 136-139 of the 1977 UCS review of the final RSS 1/ and

1/ H. W. Kendall, et al., The Risks of Nuclear Power Reactors: A Review of the NRC Reactor Safety Study WASH-1400 (NUREG-75/014), UCS, Cambridge, Massachusetts, 1977.

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are amplified in this letter. UCS has also drafted for your consideration a proposed Statement of Policy and Notice of Intention to Promulgate Regulations which is also enclosed.

The RSS was not a mere piece of collateral technical research supported by the AEC. On the contrary, the RSS was undertaken by the AEC in 1972 for the critically important purpose of establishing a solid, scientific basis for the AEC's claims about the safety of nuclear power reactors in operation and under construction in the United States. Those claims had been under increasing attack for a number of years and were fueled by the fact that research programs on critical safety issues were repeatedly delayed and are, in fact, still largely incomplete. While the AEC maintained that serious nuclear accidents were "highly unlikely" in plants conforming with its regulations, it had no documented estimates of accident probabilities or of the overall level of risk posed by the commercial nuclear electric generating facilities 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 the Commission. It will, in my opinion, require a very substantial technical effort over a considerable length of time. 2/

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 licensing of nuclear plants while the RSS was "perking along" was just to "wave arms and talk loud." 3/

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 (or, conversely, the level of

2/ Peter Morris, "Federal Agency Comments on Accident Analysis," AEC internal memorandum, April, 1972.

3/ Stephen H. Hanauer, "Notes on MIT Study Proposal," AEC Internal memorandum, March 22, 1972.

residual risk) 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 withdrawal of NRC's endorsement of the RSS and its findings leaves the NRC with no technical basis for concluding that the actual risk is low enough to justify continued plant licensing and operation.

The NRC Staff's position, as we see it evolving, is that the withdrawal of official NRC support for the RSS will have no impact on outstanding NRC licenses, because the Staff never "used" the RSS as a basis for licensing. Aside from the fact that the Staff has used the RSS when it suited them -- in their response to Browns Ferry, in response to the UCS Electrical Connector/Fire Protection Petition, in the North Anna turbine missile question, etc. -- the Staff's logic is defective. The fact that prior to the RSS the Staff avoided the issue of systematic risk assessment and had simply been making implicit and explicit claims about overall plant safety without technical justification hardly provides a satisfactory rationale for continued plant licensing. The NRC must make a definitive finding of plant safety -- it must assemble proof that the actual level of risk is very low -- when it issues nuclear plant operating licenses. If the RSS does not meet this burden and the NRC has no other systematic assessment of the level of safety achieved through its regulations, the NRC must reassess the status of existing licenses irrespective of the Staff's contentment with the wisdom of their "judgments." The issue is whether a technically and legally defensible and prudent basis support the finding that the NRC regulations provide a sufficient level of protection of the public health and safety.

The large issues posed by the deflation of RSS cannot be avoided by assuming that the Staff can simply banish RSS from the regulatory process and return to the pre-RSS state of affairs, which amounted to licensing on the basis of unsupported "judgment" on overall plant safety. Implicit in all such technical judgments is, fundamentally, the judgment that, considering the safety precautions required by the agency, the probability of a catastrophic accident is acceptably low. These judgments had, over a period of years, achieved

a kind of traditional status, akin to folk wisdom or, indeed, religious beliefs; they were accepted because they had always been accepted. However, it was acknowledged by the most senior technical members of the Staff that these traditional "judgments" lacked adequate technical support. That is the clear purport of the earlier quotes from Drs. Morris and Hanauer; to correct this situation was the rationale for the RSS, a study which has now been shown to have failed to provide that support. The Commission cannot at this point countenance a retreat back to the exercise of unsupported or unsupportable judgment in making critical decisions about the level of reactor safety. You have to be able to know that, when you license reactors, there is a rational basis for concluding that the public health and safety is adequately protected.

The Risk Assessment Review Group Report is not the only development that puts before the NRC the basic question of whether the level of safety in operating reactors is acceptably high. The cataloguing of generic unresolved safety problems, now being done under a statutory requirement, has produced a disturbing picture of the Staff's lack of knowledge on a broad range of fundamental safety issues. Reference is made here to the January, 1978, Staff document NUREG-0410 -- NRC Program for the Resolution of Generic Issues Related to Nuclear Power Plants.

Consider, as an example, some of the acknowledged generic problems pertaining to the GE boiling water reactors now in widespread commercial use. According to NUREG-0410, serious feed water nozzle cracking has been discovered, a potential compromise of primary system integrity. Again according to NUREG-0410, the GE ECCS, intended to mitigate and control loss-of-coolant accidents resulting from primary system rupture, may not be able to fulfill this function satisfactorily because steam coming out of the core may divert ECCS spray water from the hotter bundles -- a problem, incidentally, brought to the AEC's attention in 1972 by UCS. Finally, NUREG-0410 lists the adequacy of the GE pressure-suppression containment as an unresolved issue. Rather than "defense in depth," the safety of GE BWR's depends on what may be nothing more than a series of Maginot Lines. Yet, despite the lack of any technically defensible basis to do so, the NRC Staff has decided to let all of the affected GE plants continue to operate. This has required a blanket waiver of at least one of the substantive safety regulations.

These are not isolated examples of regulatory failure. There are literally dozens of known unresolved safety problems identified in NUREG-0410, more than a few of which are of very significant dimension. A list of the outstanding safety issues identified in that report is appended.

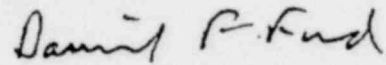
The Atomic Energy Commission, which had dual responsibilities for promoting as well as regulating nuclear power, allowed the operation of nuclear power plants in the face of very large uncertainties about safety. The AEC boldly proclaimed, ex cathedra, that the risks were negligible, and repeatedly concealed evidence indicating the contrary. When the Nuclear Regulatory Commission came into existence, it adopted uncritically and without any independent technical review all the AEC regulations and claims relating to nuclear safety. UCS suggested to NRC Chairman Anders, when he assumed office, that the agency carry out a review of the technical adequacy of the safety regulations it inherited from the AEC. We were informed months later, however, by Director of Regulation Ben Rusche, that NRC had carried out no such independent review of the safety regulations it adopted and had no intention of doing so. The RSS, it was asserted, justified NRC's confidence in the safety of nuclear plants holding its licenses. Thus, the Review Group Report, invalidating the RSS, undermines the fundamental basis of the commercial nuclear power program in the United States.

No doubt the Commission will move swiftly to correct the public relations aspect of this problem by issuing a policy statement disavowing the RSS. To stop at the public relations level, however, would be to overlook the fundamental issue that NRC now confronts: how to deal with the fact that 70 commercial power reactors of uncertain safety are now in operation. We do not envy the position that the NRC Commissioners find themselves in. It is obvious that a decision to suspend or modify the licenses for these plants, and for future nuclear power plants where licenses or permits are pending, would have tremendous economic and political repercussions. We have no illusions about how difficult it will be to try to rectify the problems that have arisen because of previous Atomic Energy Commissions' commitment to nuclear development. We believe, however, that after more than two decades in the commercial nuclear power program, it is time that the officials who must make the basic safety decisions squarely confront the issue of whether nuclear power plants of current designs are safe enough to operate. The rulemaking proceeding outlined in the

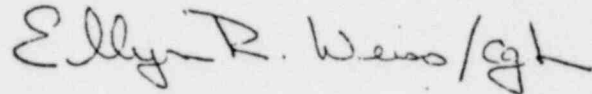
NRC Commissioners
November 1, 1978
Page 6

attached draft Policy Statement provides a means that the NRC
can use to address this issue.

Sincerely,



Daniel F. Ford
Union of Concerned Scientists



Ellyn R. Weiss
Counsel to UCS
Sheldon, Harmon, Roisman & Weiss

DFF/ERW/cgh
Enclosures

1819 123

DRAFT NRC STATEMENT OF POLICY CONCERNING
REACTOR SAFETY STUDY AND NOTICE OF
INTENTION TO PROMULGATE REGULATIONS

In 1972 the Atomic Energy Commission initiated a major study to assess the safety of commercial nuclear power plants. This project, known as the Reactor Safety Study ("RSS"), was a response to the growing public controversy over nuclear safety and to doubts about whether the AEC was able to support scientifically its official claims about the risks of serious nuclear accidents. The project was funded by the AEC and directed by Dr. Norman C. Rasmussen of the Massachusetts Institute of Technology.

The final results of the Reactor Safety Study were issued in 1975 as WASH-1400, along with an Executive Summary that purported to highlight the findings and conclusions of the RSS. The general conclusion of RSS was the optimistic assessment that the risk of a public injury from reactor accidents was exceedingly small. The NRC widely disseminated both WASH-1400 and the Executive Summary to the general public and the scientific community; Chairpeople Ray, Anders and Rowden in turn all issued public statements claiming that WASH-1400 demonstrated the low risk associated with nuclear power and the success of the AEC/NRC safety program. WASH-1400 was given to Congress and the public as evidence of the success of the regulatory program and was used by the industry in numerous advertising campaigns.

Assessment by the scientific community of WASH-1400 was, of necessity, far longer in coming because of the sheer

volume and complexity of the document, as well as the obscurity of some of its analysis. However, detailed and thoughtful criticism of WASH-1400, including substantial analyses by a committee the American Physical Society and by the Union of Concerned Scientists, were published in 1975-1977. The nature and extent of the peer criticism was serious enough to cause the NRC in July, 1977 to establish a panel of scientists under the Chairmanship of H.W. Lewis to review WASH-1400 and its peer comments and to report their findings to the NRC. This panel was designated the Risk Assessment Review Group.

The Risk Assessment Review Group completed its work published as NUREG/CR-0400, 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 because of some unjustifiable methodological and statistical techniques, among other reasons.

Moreover, the Risk Assessment Review Group found that the Executive Summary of WASH-1400, by far the most widely read part of the document, is seriously misleading. It understates the potential consequences of reactor accidents actually found in WASH-1400 and overstates the certainty of

the results. The Executive Summary has led to distortion and misuse of WASH-1400. Finally, 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 Commission has reviewed the content of the Risk Assessment Review Group Report. In addition, we have considered the implications of the report for the manner in which the NRC regulates and licenses nuclear power facilities. NRC hereby endorses the basic finding of the Review Group Report that 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 risk to the public from nuclear accidents are extremely low as compared to other risks.

Because of the great publicity given to the WASH-1400 results by the AEC/NRC and by the nuclear industry, the Commission has a special responsibility to disseminate and explain the significance of the Risk Assessment Review Group Report. Accordingly, the Commission has decided to take the following steps:

- 1.) to withdraw WASH-1400 as an official NRC document, i.e., as a document whose accuracy receives official NRC support.

1819 126

2.) to transmit the Report of the Risk Assessment Review Group and this policy statement to all persons and agencies who received copies of WASH-1400 and to all foreign governments and agencies which have made use of WASH-1400.*

3.) to hold briefings for members of the Congress and the press to explain the Risk Assessment Review Group Report.

4.) to direct the NRC to make no use of absolute risk figures and consequence figures from WASH-1400 in the licensing and regulatory process. Any use of probabilities by the Staff must be independently supported and must be based on an adequate data base and an accurate statement of uncertainty.

The Commission, as noted above, has reviewed the broader policy implications of the Review Group's finding that the RSS accident probability assessments are invalid. The AEC, and then the NRC, explicitly and implicitly licensed reactors on the basis of claims about accident probability. They have used a kind of risk assessment to classify accident sequences as either "credible" or "incredible." Accidents for which the Staff judged the probability to be less than 1×10^{-6} have traditionally been classified as "Class 9" - the so-called

*The Commission will also circulate with each copy of the Review Group Report a letter dated October 18, 1978 by Daniel F. Ford of the Union of Concerned Scientists that corrects a significant error in the Review Group Report.

incredible event. Despite the potential catastrophic consequences of such events, they have been disregarded in the licensing and regulatory process. The implication of the Risk Assessment Review Group Report, that AEC/NRC accident probability claims which have formed the basis for licensing decisions may be invalid, has sobering implications for NRC policymaking.

Accordingly, the Commission hereby initiates rulemaking proceedings to address the following questions:

1.) Is the level of safety provided by present NRC regulations sufficiently high to ensure the protection of the public health and safety?

2.) Are there significant accident sequences, such as core meltdown, not presently considered in the licensing process?

3.) Are there additional safety systems required which are not now incorporated in the design of nuclear plants?

4.) Is the level of safety in operating reactors, particularly those located in densely-populated areas, sufficiently high to ensure the protection of the public health and safety? If not, what measures are required to ensure the public health and safety with respect to operating reactors?

5.) In view of the presently existing data base and the state-of-the-art in risk assessment methodology,

is it appropriate to classify certain possible accidents with potentially catastrophic consequences, such as core meltdown, as incredible for purposes of the licensing process?

6.) If risk assessment is appropriately used to exclude the consideration in licensing of certain accidents, what is the proper measure of potential risk and potential consequences and which accidents should be classified as "incredible?"

Pending the outcome of rulemaking proceedings on the subjects listed, the Commission must determine whether interim measures are required, especially with respect to assuring the protection of the public health and safety. Among the options available are the following:

- 1.) to suspend the issuance of construction permits and operating licenses.
- 2.) to order construction halted on all plants which have not yet received operating licenses.
- 3.) to identify the operating reactors which must be shut down, derated or modified in order to ensure a sufficient level of public safety.

The Commission has decided to solicit public comment on interim options as well as the long-term rulemaking. We have also decided, as a prudent precaution which does not prejudice future Commission action, to direct the NRC Staff to develop a contingency plan for the orderly shutdown, derating and/or

modification of operating reactors. This plan should establish priorities considering the age, design and location of each plant, and if necessary, alternatives for meeting the power needs of the affected area.

Public comments addressed to the interim measures shall be received within 30 days of publication of this notice. Public comments on the long-term study and rule-making shall be received within 45 days of publication of this notice. Commenters are requested to specifically address the 6 questions listed above. Commenters are also requested to discuss the manner in which these proceedings should be conducted in order to fully involve the independent scientific community and the public in an effort to fully assess the risks associated with nuclear power plants..

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

RELATED CORRESPONDENCE

In the Matter of)

METROPOLITAN EDISON)
COMPANY, et al.,)

(Three Mile Island)
Nuclear Station, Unit)
No. 1))

Docket No. 50-289
(Restart)

CERTIFICATE OF SERVICE

I hereby certify that a copy of "Union of Concerned Scientists Response to First set of Staff Interrogatories" was mailed first class postage pre-paid this 18th day of January, 1980 to the following parties:

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ATTN: Chief, Docketing and Service Section
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

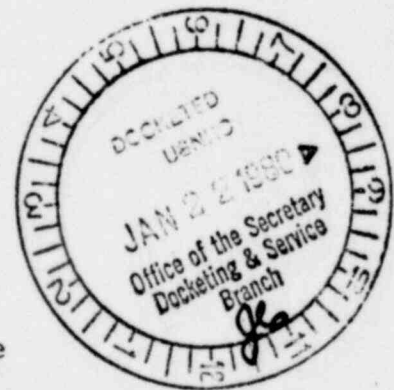
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