



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

MHS-5  
Radiation

September 22, 1978

(The Honorable John D. Dingell, Chairman  
Subcommittee on Energy and Power  
Committee on Interstate and Foreign Commerce  
United States House of Representatives  
Washington, D. C. 20515

Dear Mr. Chairman:

I am pleased to respond to your letter of August 16, 1978, requesting a status report on the Nuclear Regulatory Commission's efforts in regard to petitions to lower the Commission's dose-limiting standards for occupational exposure to ionizing radiation.

Two petitions that relate to this matter are pending before the Commission. One, filed by Dr. Rosalie Bertell on July 18, 1978, is referred to in your letter. The action to be taken on that petition is under consideration by the NRC staff. The other petition to lower occupational radiation dose standards was filed by the Natural Resources Defense Council (NRDC) on September 25, 1975; the staff recommended that the Commission deny the NRDC petition on September 28, 1977, but before Commission action was taken on the petition, it was supplemented by the NRDC on November 7, 1977.

In a meeting held on August 17, 1978, the staff briefed the Commission on the general topic of industrial radiological health, including the NRDC petition on occupational exposure. The question of lowering occupational dose-limiting standards along with other alternatives available to further control the risks associated with occupational radiation exposures in NRC-licensed activities was discussed. The Commission is now considering the staff recommendations as described in the enclosed Commission Policy Paper (SECY-78-415). The paper includes a detailed discussion of the staff's considerations of the NRDC petition, data on occupational radiation exposures, the staff's risk reduction efforts, and other information directly involved in the consideration of these matters. A chronology of the action taken on the NRDC petition is enclosed. The petition from Dr. Bertell was not received in time to be included in SECY-78-415.

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The status of the action on the NRDC petition is, in summary, that after careful consideration of a number of alternative further actions to control the risk associated with occupational radiation exposure in NRC-licensed facilities and activities and the associated costs and benefits, the NRC staff has tentatively concluded that a reduction of the dose-limiting standards is not the alternative of choice and may be counter-productive in terms of collective (man-rem) dose. A summary of the staff's present considerations regarding the risk of occupational radiation exposure is enclosed. The staff has recommended to the Commission that prior to making a final staff recommendation on the NRDC petition a hearing be held in conjunction with this petition in order to emphasize the importance of the issues, to obtain broader public participation, and to achieve more probing, in-depth discussion through the question and answer process. As further recommended by the staff, the hearing would follow receipt and evaluation of an expected report to the Environmental Protection Agency from a National Academy of Sciences committee on low-level effects. Currently this report is expected to be published in draft form this fall. If it is delayed any substantial period, the Commission would probably reconsider whether or not to hold its hearing without benefit of the report. The petition from Dr. Bertell would appear to be sufficiently related to the NRDC petition that NRC action on the latter would likely affect its action on the former.

Both of these petitions relate to the broader issue of the protection of workers from exposures to ionizing radiation. The pace of resolution, while reflecting the complexity of, and the scientific uncertainty associated with, this issue, is by the same token, consistent with proper and definitive resolution of the issue. It is also important to note that the fundamental issue of the biological effect of low-level radiation is not resolved and is carefully being addressed not only by the National Academy of Sciences committee, but also by a government-wide study being conducted under the aegis of the Department of Health, Education and Welfare.

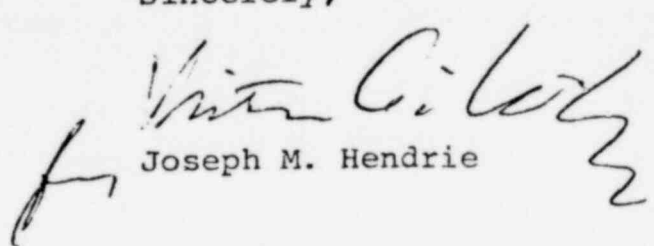
The Commission has recently taken several actions to further worker protection. These include, for example, issuance of proposed amendments to 10 CFR Parts 19 and 20 intended to assure control of exposure to transient workers, amendments to 10 CFR Part 20 designed to obtain better data on occupational exposures, and issuance of Regulatory Guides 8.8

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and 8.18 providing information relevant to ensuring that occupational exposures are as low as is reasonably achievable at power reactors and at medical institutions. In addition the NRC's Office of Standards Development is about to contract for a review of the much discussed Hanford mortality data.

We will keep you informed of developments in these matters.

Sincerely,

  
Joseph M. Hendrie

Enclosures:

1. Chronology of the NRDC Petition
2. Summary of Staff Recommendations
3. SECY-78-415 - Copy of enclosure in SECY Records

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## CHRONOLOGY OF ACTIONS TAKEN ON NRDC PETITION

On September 26, 1975, the Natural Resources Defense Council (NRDC) filed a petition to amend 10 CFR Part 20. That petition states that "The objective of the proposed action is to reduce the genetic risk associated with radiation exposure at the current occupational exposure level by a factor of 10 and reduce the somatic risk by a factor of 6." The NRDC also requested that "The NRC institute hearings to determine the 'as low as practicable' extent to which the exposures can be maintained below the proposed new regulations." The NRDC proposal would result in reducing the occupational dose limiting standards to 0.5 rem annually; somewhat higher exposures might be permitted workers more than 45 years old.

The NRDC filed an almost-identical petition with the Environmental Protection Agency (EPA). The EPA denied the petition on August 10, 1976.

The NRDC petition was published by the NRC in the FEDERAL REGISTER on October 29, 1975 (40 FR 50327) to permit public comment. The comments received included three letters supporting the petition, one proposing an alternate set of reduced limits, and 52 opposing the petition.

The staff submitted its recommendation regarding the petition to the Commission on September 28, 1977. On October 17, 1977, members of the staff met with Drs. Cochran and Tamplin of the NRDC to discuss the status of the petition; at that time the petitioners were told that the staff had

recommended denial of the petition. On November 4, 1977, prior to a decision by the Commission, a supplement to the petition was received from the NRDC. In this supplement the NRDC requested that the Commission consider evidence not cited in the original petition, viz., interpretations of two epidemiological studies, one performed by Drs. Mancuso, Stewart, and Kneale and another performed by Dr. Irwin D. J. Bross and Mr. N. Natarajan. The NRDC, on November 7, 1977, also submitted a similar supplement to EPA. In a letter dated December 2, 1977, the EPA advised the NRDC that the EPA staff was already examining the submitted studies in connection with a comprehensive review of occupational exposure standards, and agreed to reconsider the denial of the petition.

On December 7, 1977, the staff advised the Commission that staff assessments of the two epidemiological studies were already in progress when the NRDC supplement was received, and that the most straight-forward and least time-consuming approach would be to defer Commission action until the assessments have been completed and incorporated into a staff paper which would also contain the staff's recommendation regarding the NRDC request for a hearing.

On August 17, 1978, the staff briefed the Commission on the NRDC petition as one part of further action to be taken to control risk associated with occupational radiation exposures in NRC-licensed activities. The staff recommended in SECY-78-415 that no action be taken on the NRDC petition at this time, but that a hearing be held to consider the question of

reduction of individual dose limiting standards following publication and evaluation of the new (third) report of the National Academy of Sciences (NAS) Advisory Committee on the Biological Effects of Ionizing Radiation (BEIR Report). That report is expected to be published by the NAS later this year.

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SUMMARY OF STAFF CONSIDERATIONS  
REGARDING THE  
RISK OF OCCUPATIONAL RADIATION EXPOSURE

Prior to the receipt of the NRDC petition the Commission staff was acutely conscious of the trend toward increased collective (man-rem) doses to workers in the nuclear industry, particularly in nuclear power plants. Staff study of this problem indicated a number of alternative methods for reduction of the overall risk of radiation exposures. One of the alternatives involves reduction of the individual dose limiting standards, as petitioned by NRDC. However, a question arises as to whether lower dose limiting standards for individuals would decrease or increase the collective dose, and thus the overall risk.

It has been the policy of the NRC/AEC since the initial publication of 10 CFR Part 20 in 1957 to assume the hypothesis that the biological effects of ionizing radiation, delivered at low doses and low dose rates, can be conservatively predicted by linear extrapolation (to zero dose) of effects that have been observed following exposures at high doses and high dose rates, i.e., the linear hypothesis. According to this hypothesis, some degree of risk is associated with any radiation dose, however small, and the risk is directly and linearly proportional to the dose. Acceptance of this hypothesis essentially dictates that an effort should be made to control both the individual worker's dose and the collective (man-rem) dose to all workers, and since 1971 the Commission's regulations have included both of these concepts.

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Recently, several members of the scientific community have published information which suggests that the linear hypothesis may be incorrect. Certain of these scientists (Scientific Committee 40 of the National Council on Radiation Protection and Measurements (NCRP); United Nations Scientific Committee on the Effects of Atomic Radiation, in "Sources and Effects of Ionizing Radiation," 1977) maintain that the linear hypothesis overestimates the risk from exposure to radiation. Conversely, two recently completed interpretations of epidemiological data (Mancuso, Stewart and Kneale; Bross and Natarajan) indicate that the linear hypothesis underestimates the risk by a factor of ten or more. A further study of this risk of exposure to ionizing radiation is being conducted by the Advisory Committee on the Biological Effects of Ionizing Radiation (BEIR Committee) of the National Academy of Sciences - National Research Council, and a report is expected later this year. It is the NRC staff's opinion that major changes in the basic dose standards should not be considered until there has been opportunity for evaluation of the new (third) BEIR Report. The staff has been advised that the EPA also does not plan to take a position on this matter without benefit of the new BEIR report.

Confronted with present uncertainties regarding dose-effect relationships, some of which are not likely to be resolved for many years, it is necessary for the Commission to consider further regulatory strategy to assure the workers are adequately protected.

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The staff's analysis of the problem includes consideration, as two separable matters, of basic dose limiting standards and the concept of maintaining occupational radiation exposures as low as is reasonably achievable (ALARA). The staff believes (1) that lowering the dose limiting standards as requested by the NRDC, and Dr. Bertell, would increase the collective dose, at least initially, and that for licensed activities other than nuclear power, the higher collective dose would not be subsequently reduced, and (2) that the costs for effecting subsequent collective dose reductions in the nuclear power industry would be unreasonably high. The staff has recommended to the Commission that (1) a reasonable additional effort should be made to control further the overall risks associated with occupational radiation doses, and (2) appropriate control of risk can be achieved through regulatory action which places additional emphasis on maintaining occupational doses as low as is reasonably achievable (ALARA) by making individually developed ALARA programs a regulatory requirement and making these programs inspectable and enforceable. It should be noted that such regulatory action is being recommended by the staff irrespective of the dose limits question.

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