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

CHAIRMAN

January 24, 1991

The Honorable John Glenn, Chairman
Committee on Governmental Affairs
United States Senate
Washington, D. C. 20510

Dear Mr. Chairman:

I am responding to your October 3, 1990 letter, in which you requested clarification of several issues concerning our recently issued Policy Statement on Below Regulatory Concern (BRC). Enclosed are responses that specifically address each of these issues.

As you recall from our letter to you on June 27, 1990, the BRC policy builds on an earlier policy (1986) addressing waste disposal exemption decisions. The focus of the recent BRC policy extends beyond waste disposal to offer a consistent framework for NRC exemption decisions involving very low levels of radiation, such as those involving the cleanup and release of lands and structures for unrestricted use and consumer product exemptions. In issuing these two policy statements, the Commission believes that the nation's interests are best served when exemption decisions are made on a consistent basis to ensure protection of human health and the environment. The Commission remains committed to the proper regulation of radioactive materials under its jurisdiction based on the risks that those materials pose. To require that all radioactive materials be controlled in the same strict manner regardless of the risks they pose would not be a sound use of limited national resources. In this regard, we believe our approach is fully consistent with those of other Federal agencies, such as the Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA), who have formulated or are attempting to formulate similar policies for the hazardous material they regulate.

The NRC briefed your staff and others who were interested at the time we announced the BRC policy. The NRC stands ready to further clarify any remaining areas about the policy at your request.

Sincerely,

Kenneth M. Carr

Enclosure:
Responses to Questions

cc: Senator William V. Roth, Jr.

RESPONSE TO COMMENTS AND QUESTIONS OF SENATOR GLENN

COMMENT/QUESTION 1. "Perhaps the greatest concern to me is the apparent absence of methods by which the NRC will ensure that during an exemption action, everything will take place according to plan. It is not clear to me that the NRC will be able to determine, for example, that a licensee is, in fact, dumping only the allowed amounts and types of radioactive waste at a municipal landfill."

RESPONSE 1.

The Commission will determine compliance with BRC criteria, as they may be incorporated into NRC licensing and rulemaking decisions, using the same general methods the Commission already uses to evaluate licensees' practices and verify compliance with existing license conditions and regulations. The approach is based upon an audit system of inspection and enforcement. NRC inspects licensees on a periodic basis, including unannounced inspections. Enforcement actions are promptly initiated when NRC identifies violations of license conditions or regulations. This approach has generally proven to be effective in ensuring protection of the public health and safety and the environment by the commercial nuclear industry over the last forty years.

The specific methods that will be used to ensure compliance with BRC provisions will be determined primarily through the rulemakings that will be necesary to implement the BRC policy. These rulemakings will be based on careful review and analysis by the NRC and other appropriate agencies (e.g., the Environmental Protection Agency and State agencies for decommissioning criteria). The rulemakings will be conducted in an open environment with opportunity for public review and comment. During the rulemaking process, NRC will establish specific conditions, constraints, and requirements that are necessary to ensure that licensee actions are carried out in accordance

with the exemption provisions. NRC would then specifically authorize licensees to use the exemption provisions through their licenses, provided that they abided by the conditions, constraints, and requirements. Once an exemption is granted, the NRC will examine records and verify adherence to the exemption conditions through periodic, on-site inspections. Such inspections would be initiated as a routine matter or in response to allegations and reports from third parties and licensee employees. Violations of the requirements would trigger enforcement actions in accordance with Appendix C of 10 CFR Part 2, including, where appropriate, orders to take special actions to protect the public health and safety and the environment (e.g., characterization and removal of contaminated material in excess of authorized limits).

NRC's implementation of decommissioning criteria provides a concrete example of how the Commission will make every reasonable effort to ensure that exemption actions take place according to plan. In accordance with the BRC policy and the Commission's General Requirements for Decommissioning Nuclear Facilities (53 FR 24018, June 27, 1988), the NRC staff is presently developing residual radioactivity criteria to guide the decontamination and cleanup of contaminated structures, lands, and other materials. NRC is coordinating the development of the criteria with EPA and other cognizant Federal and State agencies.

Once established, these criteria would be used by NRC to evaluate the adequacy of licensee decontamination and cleanup programs. As a part of this process, NRC intends that licensees would demonstrate through appropriate radiological surveys that residual radiation is below the criteria prior to termination of licenses and release of sites for unrestricted use. NRC's review of the licensee's cleanup program, including documentation of compliance with the criteria, will evaluate potential human and environmental exposure to residual radioactivity, such as potential future releases to groundwater and surface water resources. In addition, NRC would independently verify compliance through its own surveys and require licensees to take additional actions where appropriate to ensure protection of the public health and safety and the environment. Collectively, these actions on the part of licensees and the NRC will provide reasonable assurance that future cleanup actions are completed in accordance with the residual radioactivity criteria.

COMMENT/QUESTION 2. How will the Commission determine that 10 years down the road, a decommissioned site is not beginning to contaminate ground water more than had been anticipated?

RESPONSE 2.

As discussed in Response 1, the NRC intends to analyze carefully the potential for future contamination or migration of residual radioactivity before the NRC would terminate a license and release a site for unrestricted use. The Commission would not terminate a license without reasonable assurance that residual radioactivity will not cause future contamination of ground water resources or pose significant risks to human health and the environment.

The NRC staff is presently wrestling with this issue, which appears to be especially problematical for naturally occurring radionuclides associated with licensed activities like uranium, thorium, and radium. Given the background levels of these long-lived radionuclides that occur naturally in the environment, it may be difficult to demonstrate compliance with residual radioactivity criteria that are consistent with the criteria in the BRC policy statement, let alone more stringent criteria. The NRC staff is conducting analyses of the potential release and environmental transport of these and other radionuclides from contaminated soils and structures using the best available scientific data and NRC's regulatory

experience. These analyses will be used to select residual radioactivity criteria that are conservative in light of the uncertainties associated with environmental transport of radionuclides to provide reasonable assurance of protection of the public health and safety and the environment.

One of the objectives of NRC's decommissioning regulatory program is to ensure that future releases from decommissioned sites in excess of appropriate requirements and criteria are highly unlikely. Nevertheless, in the remote event that such releases do occur, NRC would take whatever actions were necessary to ensure protection of the public health and safety and the environment. NRC is currently requiring cleanup of a limited number of nuclear facilities that were released for unrestricted use prior to NRC's inception in 1975, but were subsequently found to contain elevated levels of contamination. These actions could include, for example, requiring a former licensee by order to undertake additional characterization, monitoring, or cleanup actions to assess and correct excessive releases of radionuclides from a decommissioned site.

COMMENT/QUESTION 3. "In any case, NRC will clearly have to expend considerable manpower and financial resources to model and plan a BRC action before it is approved and, after the fact, to validate the assumptions upon which the action was made and to ensure compliance. I respectfully request that you provide me with your assessments of the NRC resources that must be committed for this purpose."

RESPONSE 3.

The resources necessary to implement the BRC policy will depend in part on the number and type of exemption petitions submitted to the Commission and the NRC's response to the petitions, as well as the results of our ongoing re-evaluation of existing generic exemptions. As stated in the Commission's July 20, 1990 response to Congressman Miller, the NRC plans to spend about 9,000 additional staff hours (4 FTE) per year for BRC activities due to the policy. These resources are planned to complete the systematic review of all existing, generic exemptions for consistency with the policy; development of regulatory documents (rules and regulatory guidance) for consistent implementation of the policy; and evaluation of at least one new petition for exemption per year.

These efforts would be over and above current efforts that are related to the concept of BRC, but predate the release of the policy statement, including development of the residual radioactivity criteria, which are necessary to implement fully the Commission's General Requirements for Decommissioning Nuclear Facilities (53 FR 24018, June 27, 1988), and

analysis of petitions for rulemaking, such as the petitions submitted by Rockefeller University and University of Utah for certain types of biomedical research wastes. NRC has budgeted approximately 18,000 staff hours (8 FTE) and 1.2 million dollars in contractual support in each of the next several years for activities related to and precipitated by the BRC policy.

Resources for inspection and enforcement activities associated with the BRC policy would be in addition to the estimates above. However, it is difficult to estimate the level of resources for these activities as their need will be determined by the rulemakings and other NRC actions taken to implement the policy and because NRC is already conducting some of these activities without the benefit of the coordinated and consistent framework provided by the BRC policy. For example, establishment of residual radioactivity criteria may actually decrease the present level of resources assigned to inspection and verification of decommissioning actions because implementation of the policy would provide for consistent criteria, which presently are evaluated and adopted on a site-specific basis. Thus, implementation of the BRC policy through development of generic criteria should save NRC inspection and enforcement resources in this area. Overall, we expect that the BRC policy and related activities will lead to a more efficient use of agency resources in evaluating, implementing, inspecting, and enforcing exemption decisions.

COMMENT/QUESTION 4. "Under authority of the Safe Drinking Water Act, EPA has promulgated maximum contaminant levels for water in community water systems. Among these is a 4 mrem annual limit on dose from the ingestion of man-made radionuclides. Would you please describe the system by which NRC will ensure that all exempt practices in a locality together will give rise to a concentration of radionuclides that satisfies this limit?

RESPONSE 4.

In evaluating potential exposures from exempted practices, NRC will consider all pathways of exposure, including ingestion of contaminated surface water and groundwater resources that may supply community and private water systems. The Commission recognizes that other regulations and standards, including the EPA drinking water standards, may apply to exempted practices in addition to requirements and conditions established by the NRC in accordance with the BRC policy.

The "system" to ensure compliance with the other regulations will depend on the specific characteristics of the proposed exemptions and, thus, will be determined as NRC proceeds to implement the BRC policy and related activities. Evaluations of specific exemptions will consider the cumulative impact of previous exemptions as they may reasonably affect the critical population group, the group of individuals likely to receive the highest exposures from exempted practices. In addition, defining practices broadly, as indicated in the BRC policy statement, also provides assurance that potential effects of exemptions will be considered in their entirety and not in a piecemeal fashion. Although it is unlikely that members in this group

would be exposed to significant doses from more than a handful of exempted practices, the Commission will not approve proposed exemptions until we are satisfied that the cumulative exposure of members of the public does not exceed the criteria in the policy. NRC would also consider the extent to which cumulative exposures are limited by other regulations or standards, such as the drinking water standards. Any rulemaking that would establish a generic exemption which could have a significant effect on the environment would be evaluated in accordance with established requirements in 10 CFR Part 51 pursuant to the National Environmental Policy Act.

COMMENT/QUESTION 5. "It is well known that some forms of micro-electronic, photographic, and nuclear counting equipment are highly sensitive even to trace amounts of radioactivity. By what criterion will the exemption policy ensure that virtually no waste radioactivity contaminates the stream of general industrial materials used in the production of such equipment?"

RESPONSE 5.

The NRC recognizes this concern and will carefully consider in its review of potential exemptions (1) the potential impacts of recycling and (2) public comments on recycling, including specific concerns of potentially affected industries. This concern is addressed in the Implementation Section of the BRC policy as well as the 1986 policy on BRC waste. In addition, the concern has also been recognized by industry, which has already established specific acceptance criteria for raw materials to ensure that the integrity of their products is not compromised by contamination from naturally occurring as well as other radioactive materials.

COMMENT/QUESTION 6. "NRC has suggested that perhaps contaminated metals such as steel, copper, and nickel be recycled only within the nuclear industry, or possibly in the construction of radiologically 'safe' structures, such as bridges. If so, the Commission would have to ensure that the furnaces, etc., employed in the reprocessing, and the end-product recycled materials themselves, are used properly and as authorized -- for example NRC would have to keep track of the steel from a bridge 50 years from now, or more, when the bridge itself is recycled."

RESPONSE 6.

We are unaware of the source of this suggestion. Exempting material in quantities or concentrations that would necessitate continued tracking and restricted use of material is not consistent with the Commission's intentions in formulating the BRC policy. NRC's comprehensive assessment of proposed exemptions would consider all potential routes of exposure, including the potential for short-term and long-term recycle of the materials into products used by the public.

COMMENT/QUESTION 7. "The NRC has determined that in considering the exemption of consumer products, such as cooking utensils made out of contaminated steel, it would not consider whether or not the use of such steel is justified, because 'making decisions outside the normal arena of its expertise' might leave the Commission open to criticism. Who is better qualified than the NRC to determine what sorts or practices involving the use of radioactive materials are justified?"

RESPONSE 7.

It is important to distinguish between whether the risks from radioactive materials are acceptable and whether a product containing radioactive material is of value to the public. Commission exemption decisions in accordance with the BRC policy will determine whether the risk posed by the radioactive materials is sufficiently low to ensure protection of the public health and safety and the environment. In contrast and as stated in the BRC policy, the Commission believes that justification decisions usually derive from considerations that are much broader than radiation protection alone. This view is consistent with the position of the International Atomic Energy Agency in its safety series Report No. 89. The Commission majority believes that justification decisions involving social and cultural value judgments should be made by affected elements of society. For example, the general public should decide whether a particular consumer product that intentionally contains radioactive materials is justified in terms of net societal benefit, provided that NRC first determines that doses to individuals in the critical population group are acceptably low in accordance with the criteria in the BRC policy.

COMMENT/QUESTION 8. "It is my understanding that if either an Agreement State or a non-Agreement State decides to impose more stringent requirements for a BRC policy, or to do away with it altogether, the state would not be allowed to do so. Would you please explain the benefits of such an approach, in view of its inconsistency with environmental policy in other areas, and its obvious potential for generating significant ill will with the public?"

RESPONSE 8.

The BRC policy does not resolve the issue of whether Agreement States should be required to adopt compatible requirements. The BRC policy is not a rule; it does not exempt any radioactive materials from regulatory control. As stated in the policy, the Commission will decide in each rulemaking that implements the BRC policy whether the requirements associated with any exemptions should be adopted uniformly by Agreement States. These decisions will fully consider the need for such uniformity in order to ensure protection of the public health and safety and will have the benefit of State review and comment.

Because of concerns over this issue and others, however, the Commission recently directed staff to reexamine the general issue of Agreement State compatibility under section 274 of the Atomic Energy Act, as amended, and will review the issue in greater detail over the coming months.

Based on the Commission's extensive experience in cooperating with States through section 274 agreements, the Commission believes that one of the principal benefits of compatibility is to ensure, on a national basis, a consistent and appropriate level of protection of the public and the environment from the hazards associated with ionizing radiation. Left unchecked, implementation of radiation protection regulations that vary significantly from state to state could disrupt interstate commerce, could impose costly and unjustified burdens on licensed activities such as biomedical treatment and research programs, and could potentially result in increased risk to the public and the environment. The legislative history attests to Congress' concerns about such impacts in the development of the legislation in section 274 that authorized the successful and cooperative Agreement State program of today.

Commissioner Curtiss' additional views on the issue of Agreement State compatibility are set forth in the attached excerpt from the "Additional Views of Commissioner Curtiss" on the BRC Policy Statement.

Agreement State Compatibility

With one exception, I concur in the general approach that this Policy Statement takes on the issue of Agreement State compatibility. The one area where I disagree involves the treatment of matters involving low-level radioactive waste disposal.

As I understand the position of the majority, the approach established in this Policy Statement, and to be implemented in the context of subsequent rulemaking initiatives, will be considered a matter of strict compatibility for Agreement State programs. As a consequence, the approach taken by individual Agreement States on BRC issues must be identical to the approach taken by the Commission. I disagree with this approach for the following reasons:

When Congress enacted the Low Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA), it vested in the States the responsibility for developing new low-level radioactive waste disposal capacity. Indeed, the Congress recognized at the time that the States were uniquely equipped to handle this important responsibility. Accordingly, the States were given a great deal of latitude in deciding how best to proceed with the development, construction, and operation of new low-level waste disposal facilities. To take one example, Congress recognized that some States may decide to construct facilities that, from a technical standpoint, go beyond the requirements established in 10 CFR Part 61 for shallow land burial facilities; for this reason, Congress directed the NRC to develop guidance on alternatives to the shallow land burial approach reflected in Part 61 (see Section 8 of P.L. 99-240). Similarly, should a State decide to require radioactive wastes beyond those defined by the NRC as Class A, B, and C wastes to be disposed of in a regional disposal facility, the Act permits the States that option as well (see Section 3(a)(2) of P.L. 99-240).[4] In short, the LLRWPAA grants States a great deal of latitude in deciding what kind of facility to build and what types of waste will be disposed of in that facility, so long as—(1) the facility complies with the requirements of 10 CFR Part 61 and (2) the State provides disposal capacity for Class A, B, and C wastes.

If one interprets the LLRWPAA in this manner, as I do, then in my judgment it is consistent with this general approach to conclude that this Policy Statement (and the subsequent rulemaking initiatives implementing the Policy Statement) should not be considered matters of compatibility. The result of such an approach would be that individual States would be allowed the option of deciding whether low-level wastes designated BRC by the Commission under this Policy Statement should nevertheless be disposed of in a licensed low-level radioactive waste disposal facility.

[4] Indeed, the Commission did not object when the Rocky Mountain compact proposed to dispose of radium waste in the Rocky Mountain compact site.

The argument, as I understand it, that is advanced in support of the approach taken in the Policy Statement—that the Commission's position on BRC should be a matter of compatibility — is that States should be foreclosed from departing in any way from the approach established by the Commission. To take the most visible and controversial example that has arisen to date, this would lead to the result that a State could not require that low-level waste streams designated BRC by the Commission nevertheless be disposed of in a licensed low-level radioactive waste disposal facility.

I am not aware of any public health and safety rationale involving low-level waste disposal that has been advanced as a basis for the NRC to insist that the Commission's position on BRC should be a matter of compatibility for Agreement States. One hears the anecdotal information about reducing exposures to truck drivers by allowing BRC waste streams to be disposed of in local landfills rather than requiring such waste to be transported across the country to a licensed low-level waste disposal facility. If examples such as this constitute the basis for declaring that a health and safety concern exists such that the Commission should, in turn, prohibit a State from requiring such waste to be disposed of in a licensed low-level waste disposal facility, then a more disciplined and persuasive presentation of the argument is needed. To date, I have yet to see such a case.[5] In the absence of a health and safety concern, it is incongruous, in my judgment, to say that the risk from a particular waste stream can be so insignificant as to be "below [NRC's] regulatory concern," but at the same time insist that we nevertheless have a sufficient interest to dictate how a State might otherwise wish to handle that waste stream.[6]

For the foregoing reasons, I would not treat the Federal policy on below regulatory concern, as set forth in this Policy Statement and subsequent rulemakings, as a matter of compatibility for Agreement States when it comes to issues involving commercial low-level radioactive waste disposal.

[5] This kind of information may well be a part of the waste stream petition that the nuclear utilities are reportedly preparing for submission. If so, I would hold open the option of revisiting this question if and when the petition is filed. But at this point, I have yet to see a health and safety justification that would support a decision on the Commission's part that states should be preempted from the option of requiring waste streams designated BRC under this Policy Statement to be disposed of in licensed low-level radioactive waste disposal facilities.

(continued)

* The argument has been made that permitting states the option of requiring BRC waste streams to be disposed of in licensed low-level waste disposal facilities would use up scarce disposal capacity and otherwise have an adverse impact on the compacting process. Indeed, this appears to have been one of the principal concerns advanced in the Commission's 1986 Policy Statement on BRC, wherein the Commission expressed the view that low-level waste generators would "be competing for space in the existing [LLW disposal] sites and the [BRC] concept should be applicable nationwide" in order to ensure "that the system works on a national basis and that it remains equitable." It was in part for this reason that the Commission declared in the 1986 Policy Statement that future "[r]ulemakings granting petitions [on BRC] will be made a matter of compatibility for Agreement States." (Policy Statement, 51 *Fed Reg* 30839, 30840 (August 29, 1986)). Whatever merit that approach might have had at the time, I disagree with it for two reasons: (1) Congress has vested states with the responsibility for developing and managing disposal capacity for low-level waste and, in view of this, decisions about how best to proceed, including decisions about whether States prefer to require BRC waste streams to be disposed of in licensed low-level waste sites rather than sanitary landfills, are best left to the individual States. (2) There is an abundance of disposal capacity under development at the present time and, for this reason, the concern about husbanding limited disposal capacity no longer appears to be relevant. Indeed, the decision to permit the Rocky Mountain compact to dispose of radium waste in its regional disposal facility seems to suggest that the objective of preserving limited disposal capacity for the disposal of low-level radioactive waste is not the driving consideration.

COMMENT/QUESTION 9. "The individual dose criterion for a single exempted practice that does not involve a large number of members of the public is 10 mrem per year. The meaning of this is not clear to me for a relatively long-lived, environmentally stable radionuclide. Could one single practice in 1990 cause 9.9 mrem of effective dose equivalent in 1990, 9.8 mrem in 1991, and so on? If so, and if one new practice in a locality is exempted each year, then after only 11 years this policy could result in an accumulation of radioactive material that would exceed, possibly for a long time thereafter, the 100 mrem annual limit recommended for members of the public by the principal international and national advisory bodies. And several unrelated, one-time-only single practices of this sort per year would together lead to the same result in much less time."

RESPONSE 9.

The individual dose criteria in the BRC policy are applied on an annual basis for average doses to members of the critical population group, as discussed in our response to comment 4. The issue of exposures from multiple exempted practices was a specific concern to the Commission and the NRC staff as it developed the BRC policy. The Commission intends to evaluate specific, proposed exemptions in the context of potential impacts associated with previous generic exemptions. As stated in the BRC policy, the Commission will ensure that exposures to exempted and licensed activities combined do not result in doses to members of the public in excess of the public dose limit of 100 mrem per year, which was recently promulgated by the Commission in final revisions to 10 CFR Part 20.

This general provision is supported by specific elements of the BRC policy, which collectively minimize the potential for multiple exposure situations

at any one time or throughout time. First, the individual dose criteria would be used as guides to restrict the dose that could be received by that relatively small number of people who comprise the critical population group, thereby limiting potential exposures to the public at large. Multiple exposures would be very unlikely from practices in the 10 mrem range because of the very low probability that the same individual would be in the critical population groups for more than one practice. NRC's review of potential exemptions would carefully consider the characteristics of the critical population groups to ensure that this is the case. Furthermore, the Commission has defined "practice" broadly so that similar activities will be defined as part of the same practice, thus effectively reducing the absolute number of practices with annual individual doses up to 10 mrem for which exemptions may be granted. Consequently, the Commission expects that any given individual could potentially be exposed at most to one or two practices in the 10 mrem range and a handful of practices at much lower doses (e.g., consumer products).

NRC's current analysis of petitions from Rockefeller University to exempt certain biomedical wastes provides a specific example of how the agency is implementing the broad definition of practice. These petitions requested an extension of existing exemptions in 10 CFR 20.306 for certain wastes containing tritium and carbon-14. The NRC staff is currently analyzing the merits of the proposed exemption not only for Rockefeller University, but for all possible licensees under the assumption that most, if not all,

medical and biomedical research licensees might use the exemption. Such a broad consideration effectively eliminates the possibility that wastes from several similar institutions could each contribute doses up to 10 mrem to the same individuals and focuses NRC's consideration on the collective impacts of such exemptions.

COMMENT/QUESTION 10. "Can a single practice give rise to 1000 person-rem of collective dose in a population every year (with the expectation of one death every other year), or does the 1000 person-rem refer to the cumulative (committed) collective dose added up throughout all time (which would be expected statistically to cause a total of 1/2 death)?"

RESPONSE 10.

The collective dose criterion applies to the dose from an exempted practice on an annual basis. The Commission analyzed in depth the issue of whether to establish a collective dose criterion, in addition to protecting individuals by establishing individual dose criteria, during development of the BRC policy. In addition, the Commission specifically solicited comments on the need for such a criterion in the Advanced Notice of Proposed Policy Development in December 1988.

As described in Chairman's Carr's additional comments that accompanied the BRC policy in July 1990, the Commission questioned the need for such a criterion because (1) there is considerable uncertainty about the scientific validity of risk estimates associated with collective doses, (2) individual dose criteria and other provisions of the BRC policy already provide for a consistent and adequate level of protection, (3) NRC traditionally has not established specific constraints on collective doses associated with licensed activities, and (4) the prevailing technical view of commenters on the BRC policy opposed adoption of a collective dose criterion. Despite these considerations, the Commission adopted a collective dose criterion to limit the total population dose associated with

exempted practices and to support evaluations of environmental impacts and radiation protection programs designed to maintain doses and exposures "as low as is reasonably achievable" (ALARA).

The majority of the Commission selected the value of the collective dose criterion based on consideration of (1) contemporary recommendations of expert national and international bodies, such as the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), (2) magnitudes of collective doses associated with practices and products that have already been exempted by the NRC and with licensed activities, and (3) potential technical problems associated with implementing a more restrictive collective dose criterion. Commissioner Curtiss' views on the issue of collective dose criterion are set forth in the attached excerpt from the "Additional Views of Commissioner Curtiss" on the BRC Policy Statement.

It is important to emphasize that your question implies a misleading sense of certainty with respect to the health risks associated with the 1000 person-rem collective dose criterion. The expectation of 1 cancer fatality every other year is based on extrapolations of the adverse health consequences to individuals that received radiation exposures hundreds to thousands of times greater than implementation of the individual dose criterion of 1 and 10 mrem per year would permit. In fact, the report published by UNSCEAR in 1988 concluded that collective dose calculations

only provide reasonable estimates of health risks if the collective dose is at least of the order of 10,000 person-rem, which is ten times higher than the 1000 person-rem criterion established in the BRC policy. UNSCEAR stated that the most likely outcome of collective doses on the order of a few hundred person-rem is zero deaths. The uncertainties and safety aspects associated with the scientific basis for the NRC's BRC criteria are discussed in more detail in the BRC policy statement.

Additional Views of Commissioner Curtiss

Collective Dose Criterion

I do not support the establishment of a collective dose criterion at a level of 1000 person-rem. This level is an order of magnitude higher than the level recommended in IAEA Series No. 89, as well as the level recommended by most other international groups. Furthermore, it is an order of magnitude higher than the 1986 collective dose to members of the public due to effluents from *all* operating reactors, the most recent year for which figures are available.

A collective dose criterion of 1000 person-rem would mean, for example, that if, pursuant to this Policy Statement, the Commission were to exempt on the order of fifteen separate practices with collective doses at or near the exemption level of 1000 person-rem—not an unreasonable expectation, given previous practice—we would project somewhere between 5 and 10 excess health effects annually. I consider this level to be unacceptably high, when viewed in the context of other risks that we regulate and in view of the fact that the purpose of this Policy Statement is to establish a framework for identifying those practices that the Commission considers to be below regulatory concern.

Beyond this, if the collective dose criterion is to be defined as the floor to ALARA (as I would propose below), a more conservative approach to establishing a collective dose criterion is warranted in view of the fact that doses may be truncated in the calculation of collective dose and the collective dose criterion may be applied to single licensing actions.

For these reasons, I do not support a collective dose criterion of 1000 person-rem. Instead, in view of what appears to be the prevailing technical view on this matter, I would endorse a collective dose criterion of 100 person-rem.[1]

[1] I would point out that the Policy Statement allows higher collective doses if analyses show that the collective dose is ALARA for a given practice. Therefore, adoption of the lower IAEA value of 100 person-rem based on dollar estimates of resources to do detailed ALARA analyses would not eliminate the option to approve practices such as smoke detectors that involve large numbers of potentially exposed members of the public.

COMMENT/QUESTION 11. "When calculating collective dose, NRC proposes to include in the total only contributions that are greater than 0.1 mrem per individual. I ask that NRC confirm that there are no known situations that might arise in which the sum of all individual doses below 0.1 mrem might be significant."

RESPONSE 11.

Contributions less than 0.1 mrem per individual per year may be excluded from collective dose calculations because they introduce scientifically unjustifiable complexities in the assessments and impute an unrealistic sense of the significance and certainty of such low dose levels. The Commission is unaware of any situation in which it has been established that the contribution from individual doses less than 0.1 mrem resulted in a significant impact on human health or the environment. If ever such a situation were to arise as NRC implements the BRC policy and related activities, the Commission would of course reconsider the selection of the value of this truncation level for collective dose calculations.

The Commission notes that the 0.1 mrem truncation value is fully ten times less than the 1 mrem/year value recommended by the National Council on Radiation Protection and Measurements as a negligible risk level in its Report No. 91 ("Recommendations on Limits for Exposure to Ionizing Radiation," June 1, 1987). The risk associated with the 0.1 mrem truncation value is also generally consistent with comparable thresholds employed by other regulatory agencies, such as the Environmental Protection Agency and the Food and Drug Administration.