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Statement

of

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Natural Resources Defense Council

before the

Subcommittee on Energy Research and Production

of the

Committee on Science and Technology

U. S. House of Representatives

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I. INTRODUCTION

My name is Thomas B. Cochran. I have a Ph.D. in physics, and am presently a Senior Staff Scientist at Natural Resources Defense Council (NRDC) on whose behalf I am testifying. NRDC is a national non-profit environmental organization with a membership of approximately 45,000. We have been concerned with the nuclear waste issue for a number of years and welcome this opportunity to appear before this Subcommittee.

My testimony will focus on the risks associated with the management of radioactive wastes, public perceptions and ethics as they relate to waste management, and particularly on the establishment of waste disposal criteria and an adequate licensing approach to ensure that radioactive wastes are adequately managed. Before beginning I wish to note with regard to yesterday's hearings focusing on the Interagency Review Group (IRG) report, that I recently prepared testimony for Senate hearings on this same subject.^{*/} I wish to make my statement available to this committee, although it is not necessary to include it in the Record of these hearings.

^{*/} Thomas B. Cochran, Statement before the Subcommittee on Energy, Nuclear Proliferation and Federal Services of the Committee on Governmental Affairs, U.S. Senate, March 14, 1979.

Perceptions and Personal Bias

At the onset let me state briefly a few general perceptions related to the risks associated with nuclear waste management.

a) In the hierarchy of concerns, nuclear waste management does not rank at the top of my list. Relative to other risks associated with the commercial nuclear power industry, I would rank waste management after nuclear weapons proliferation and reactor safety.

b) Safe permanent disposal of nuclear wastes in mined geological repositories is technically feasible, at least in theory.

c) It is likely that permanent disposal will be managed in an unsafe or risky manner, the reasons having more to do with institutional, as opposed to technical, uncertainties. As noted in the IRG Report (p. 87), "The resolution of institutional issues is equally important as the resolution of outstanding technical issues and problems."

d) Because of the extremely long time period during which the nuclear wastes remain hazardous, nuclear waste management involves important ethical considerations. However, nuclear waste management is far from unique in this regard. The coal technology with its CO₂ and solid waste problems and the fact that it's a non-renewable resource presents the same ethical problems. Unlike nuclear waste management, some of these problems with coal appear intractable.

The issues raised in b) and c) above are discussed more fully in my Senate testimony mentioned earlier. Issue d) relates to the discussion below.

NRDC's Waste Management Study

I wish to call your attention to the discussion on pp. 2-3 of my Senate testimony. Here I suggest that if the waste problem is to be solved properly it must be attacked in a rational and orderly way.

First, the waste problem must be carefully defined; second a definitive set of overall waste disposal criteria must be established; third, an R&D program would be established in order to identify those disposal approaches which would meet the above criteria; and fourth, based on the R&D program, sites would be selected and the waste disposal demonstration aspect would begin. NRDC has recently completed a radioactive waste management study under a small DoE contract. I am making this report available to the Subcommittee. It is perhaps unnecessary to include it in the record in that DoE will probably be publishing it as it does other contractor reports.

Part I proposes three fundamental criteria for nuclear waste management and analyzes the basis for their development. Part II develops the licensing approach that should be used to determine whether the criteria are met; and Part III draws on material presented in Parts I and II to outline the nature of the R&D program required to produce an adequate waste disposal system.

As these hearings are focused on the risks associated with waste management and the ethical considerations, I wish to focus attention on Part I, the development of criteria.

We began by looking at criteria development from three perspectives. We examined theories of distributive economics, that is, formal theories of decision-making and social choice. Drawing heavily upon materials prepared for or by the World Council of Churches and the National Council of Churches of Christ in the USA, two ecumenical groups that are currently examining Christian issues related to nuclear energy, we then examined considerations of justice and equity from a religious perspective. Finally we examined the history of citizen concern and governmental action related to radiation perspectives.

Whether approached from the standpoint of a rational, religious or public action perspective, we found that the preferred fundamental waste disposal criteria are those which, at a minimum, are neutral to future generations. The least unfair mode is one which tries to keep deliberate allocations of benefits and costs confined to a single generation, where those imposed upon by hazards are at least available for comment. The least unfair way of managing intertemporal relationships is for each generation to try to leave the earth as it was when they arrived. As a goal, the only acceptable distribution of hazards and benefits is the neutral allocation, where no pattern of benefits and hazards is imposed. Decisions striving for a neutral allocation are, therefore, the most acceptable.

Cost/benefit analysis, or any other analytic technique, alone cannot decide whether it is just or fair for the present to impose upon the future the burden of perpetual care for highly

poisonous materials. Consequently, the foundation of any waste disposal criterion must be based on fundamental value judgments rather than on ad hoc modelling considerations, and be derived from a theory of justice. Conclusions from manipulations of numerical models must not be substituted for explicit confrontations with difficult value judgments. For example, if at a certain point our society wishes to stop being fair and reasonable because we do not wish to bear the monetary costs of justice, then we should explicitly acknowledge that we prefer being wealthy and evil to being poor and righteous and not try to justify our moral vacillation with a cloud of cost/benefit models.

All of these considerations lead to the first and the fundamental criterion that should be applied to the disposal of radioactive Wastes.

Criterion #1 Nuclear operation of all types (such as mining, milling, fuel processing, decommissioning, and waste isolation or disposal) should be conducted so the overall hazards to future generations are the same as those which would be presented by the original unmined ore bodies utilized in those operations. There should be a high confidence that the risk to all future generations from radioactive waste should be less than, or (considering uncertainties in the calculation) comparable to, the risk to all future generations from the original uranium resources from which the radioactive wastes were derived, assuming these uranium resources were unmined.

In summary, this first phase of our study showed how a policy of neutrality toward the future is the most fair way to proceed. To briefly summarize the second phase of our study,

we concluded that licensing of waste management plants should be based on the defense-in-depth design philosophy embodied in nuclear reactor licensing procedures. There are a number of components of a geologic waste disposal system that have been likened to "barriers". These include a primary waste form, the waste-form matrix, the container, the backfill material, the host geologic formation and the surrounding geologic strata. To provide the defense-in-depth, we proposed that the geologic repository system should contain three independent barriers. The waste component (waste form, waste-form matrix and container) would represent one component and the site would perform two independent functions in the isolation of the wastes. We found this defense-in-depth approach in terms of licensing, that is, determining whether the fundamental criteria are met, is much preferred over the alternative of stringing together a series of unverifiable models, a la Rasmussen, to determine whether the repository meets some predetermined radioactive release criteria.

As I have provided you with a copy of the full report, I will not further elaborate on it here. I will be pleased, however, to answer any questions you may have at this time.