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UNITED STATES SENATE

JOINT HEARING ON

THE PRESIDENT'S COMMISSION ON THE ACCIDENT AT THREE MILE ISLAND FINDINGS

OCTOBER 31, 1979

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C O N T E N T S

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WEDNESDAY, OCTOBER 31, 1979

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United States Senate and United States House of Representatives, Senate Subcommittee on Nuclear Regulation of the Committee on Environment and Public Works and House Subcommittee on Energy and the Envrionment of the Committee on Interior and Insular Affairs, Washington, D. C.

The subcommittees met at 2:10 p.m., room 318, Russell Senate Office Building, Hon. Gary Hart (chairman of the Subcommittee on Nuclear Regulation) presiding.

Present: Senators Randolph, Hart, Moynihan, Stafford, Domenici and Simpson; Representatives Udall, Bingham, Weaver, Carr, Markey, Kostmayer, Vento, Huckaby, Symms and Cheney.

Senator Hart. This hearing will come to order.

Today's hearing is unprecedented in several respects.

First, this is the first joint hearing of the principal nuclear safety oversight committees of the Senate and the House.

Second, the subject of the hearing is the report of the President's Commission on the Accident at Three Mile Island. The accident was the most serious in the history of the American nuclear power program -- indeed the most serious such accident that we know of anywhere in the world. The report is the most candid and the most independent assessment to date of nuclear power. It substitutes close scrutiny and hard criticism for the gloss and the platitudes of past government studies on the performance and the regulation of nuclear power plants.

And third, this hearing continues a fair but intensive trial of the nuclear power program. The Presidential Commission report presents a striking indictment of the institutions most involved in that program -- principally the nuclear industry and the Nuclear Regulatory Commission. But the Congress is also on trial, as is the Executive Branch of government. Ultimately it is our responsibility as the people's elected representatives to determine whether nuclear power is, or can be made, safe enough to embrace as a principal source of energy. On that overriding issue, the jury is still out.

To my mind, although the Commission report squarely addresses the principal problems that caused and aggravated the Three Mile Island accident, it does not address the one question that, insome form is on every American's mind. I would stated the question this way: "Have nuclear power plants

become too large and too complex to be operated and regulated safety?"

That is the nub of it. The Commission's report stresses the uncertainty of the human factor. According to the findings, the equipment in the plant basically responded, but there were serious problems in design -- espeically of the control room -- and there were serious problems in the way plant operators, industry executives and NRC officials responded to the accident. Small comfort there, in my view: the equipment it fine; it is just the people running it that are flawed.

Therefore, I am interested in learning the individual commissioner's views as to whether Three Mile Island teaches us that we have gone too far, too fast with our nuclear power program. Are the latest 1,000 megawatt reactors, like the one at Three Mile Island, too big and too intricate to control in an emergency? Would smaller, simpler reactors perform better in terms of safety even if they are less desirable from the standpoint of cost effectiveness? Perhaps the American people are willing to pay more for nuclear-generated electricity if they can be assured it will be safe electricity as well.

Further, I am troubled by the Commission's decision not to recommend a delay in construction of new plants in light of its finding that, for safety's sake, the siting of new plants should be, and I quote the report, "to the maximum extent

feasible...in areas remote from concentrations of population." Since some of the proposed plants now awaiting construction permits do not meet this standard, why didn't the Commission recommend that new construction permits be held up until safe sites can be found?

Finally, I am concerned by the Commission's recommendation that the independent, multimember NRC be transformed into a single-administrator agency within the Executive Branch. There are some serious problems with the structure of the NRC, but I am not convinced we can best overcome these problems by putting the agency in the Executive Branch and eliminating the diversity of views provided by a multimember commission.

I hope the commissioners will provide further insight on this issue today, and I welcome their presentation. It is particularly significant that, I think, as I indicated, this is the first hearing involving jointly the Senate and House oversight committees. We are particularly pleased that the chairman of the House Subcommittee on Energy and Environment of the House Interior Committee, Congressman Morris Udall, could be present with us and members of his subcommittee.

Congressman Udall.

Mr. Udall. Thank you, Senator Hart. It is a pleasure for me to co-chair these hearings with you. I think our two subcommittees together probably bear the major responsibility over the next few months or years in coming up with some answers,

because the nuclear dilemma is not going to go away. It is a set of decisions to be made by all of us.

Dr. Kemeny, it is good to see you here today. I remember being in your home at Dartmouth, the nature of which eludes me at the moment. But I look forward to discussing your findings and to having the Commission before us.

I find that I am managing a bill at this moment in the House Chamber, one of these major energy bills, and I am not going to be able to stay very long. I am going to turn my gavel over to Mr. Bingham at that time.

Let me make a few observations before we turn to your comments.

Following the Three Mile Island accident, our subcommittee conducted a comprehensive set of hearings on the major nuclear issues, even as Senator Hart was working at the similar task. These hearings were completed in September. Early this month the subcommittee began consideration of concepts that might be incorporated into legislation. Perhaps the major issue before us is the question of whether there should be a moratorium on issuance of construction permits for nuclear power plants. This is a matter on which our subcommittee members hold a wide range of views. And I gather your commissioners are not entirely of a single mind on this issue either. After some deliberation we decided that before proceeding to write a national nuclear policy, we would wait

and see what words of wisdom you and your associates might offer on the subject.

So that you might understand the basis for some of my questions, I would say a few words as to where I come down on the overall moratorium question. After TMI -- and I am speaking about the last six months -- my position on the issue has been moving from one of opposition to a moratorium to one of tentative support, some kind of a conditional moratorium. Prior to the accident at Three Mile Island I tried to be intellectually honest and I was beginning to accept assurances that nuclear power plants could be made sufficiently safe. After all, we had had 400 reactor years of operation without a fatality. And I had hoped they would be made safe because all parties involved had an interest in making sure that accident's did not occur. I had believed instead that if nuclear development were to falter, it would be a result of adverse economics or a failure to solve the waste problem.

Your revelations and those of others have raised so many questions about the manner in which the nuclear technology has been managed that I now lean to the conclusion there should be a pause, a moratorium -- perhaps not a permanent or and unconditional one, but a moratorium -- until the industry and regulators both get their houses in order. Not because I am confident that we will find economic alternatives to nuclear power -- although I hope that such alternatives will be found

rather I am leaning this way because our country may still decide that there is a long-term need for some component of nuclear technology. If we so decide -- and that is a judgment for the people -- we must have assurances that those responsible for these potentially dangerous machines will do a much better job than has been done to date.

Thank you, Senator Hart.

Senator Hart. Thank you, Chairman Udall.

The ground rules for the hearing today are that members of the Senate and House committees will make opening statements as they desire, hopefully limited to approximately three minutes, and then we will proceed to the chairman of the Commission for their report.

With that, I would acknowledge the chairman of the Senate Environment and Public Works Committee, Senator Randolph.

Senator Randolph. Chairman Hart, I would prefer the ranking member of the subcommittee have an opportunity to speak first and then be given an opportunity to follow.

Senator Hart. Senator Simpson.

Senator Simpson. Thank you very much, Mr. Chairman.

Thank you for your usual courtesy, Senator Randolph.

I am very pleased at having this opportunity to share this opportunity with the House committee and the opportunity to discuss with Dr. Kemeny and other members of the Commission their report on the accident at Three Mile Island. I must say

I enjoyed my informal time with you yesterday, and I found you to be a rather spirited and capable group indeed, and I enjoyed that very much. I was impressed.

I feel the members of this Commission are to be commended for the thorough treatment of this most difficult question. The seriousness and dedication with which the Commission and staff approached their responsibilities is quite evident from the Commission report and supporting staff documents. Moreover, the Commission's findings and conclusions appear to me to be a fair and balanced appraisal of the accident and its implications both of nuclear safety and regulation of nuclear power in this country. As such, those findings and conclusions, I think, represent an important addition to the abundance of information available on Three Mile Island, and they will certainly receive my careful consideration in this subcommittee.

Perhaps equally important, the Commission has presented its findings and recommendations in understandable form -- in English, a very commendable attribute here in this community -- and I think yet without oversimplication you have done that. I believe that is essential if the American people are to fully understand both what happened at Three Mile Island and what those events mean for the safety of nuclear power. To me, this contribution to public understanding is, I think, one of the greatest benefits that you will perform.

Mr. Chairman, our own review of Three Mile Island and this

accident confirms many of the findings of this Commission. We have seen firsthand the human factors which played an extraordinary and significant part in the accident and in the utility's and NRC's response to it. We have also observed the attitudes on nuclear energy and safety which existed within the industry and regulatory agency prior to the accident. I would fully agree with the Commission as to the seriousness of those problems and need for corrective action.

Based upon what we have seen this far, I would also agree with the Commission that there are serious deficiencies in both the NRC's and industry's treatment of operating experience. Clearly, there are lessons to be learned and there are changes to be made.

Mr. Chairman, in conclusion, I think that the Commission has provided the President and public with a sweeping set of recommendations for change in the way nuclear plants are operated and regulated in this country. A number of those recommendations are supportive of changes which may now be under way as a result of our effort on the NRC authorization bill, including state emergency planning reforms, changes in the NRC siting practices and new initiatives in the way of operator training and qualifications. The other recommendations I think represent a very novel approach to improving our government's institutional efforts in this area, and particularly the Nuclear Regulatory Commission, and those are complex

proposals which call for careful review. I will give it, the subcommittee will give it, the chairman and chairman of the full committee will give it that review. I look for to the opportunity to explore this with Senator Hart and the Kemeny Commission and receiving more of their ideas for improving nuclear safety and regulation and the reasons and debate which led them to their significant recommendations.

Thank you, Mr. Chairman. Thank you, Chairman Hart.

Mr. Udall. Mr. Chairman, I am told they are about to vote on my bill. Before I leave, I would like to welcome Governor Babbitt, who has been a valuable member of this Commission. I hope my colleagues in the Senate and House will treat him gently. He has been razed by the taxpayers enough as it is.

Senator Hart. Governor, welcome.

Congressman Bingham from New York.

Mr. Bingham. Thank you, Mr. Chairman.

I think this is a memorable day on several counts. First of all, I would like to commend you, Chairman Hart, and also Chairman Udall for arranging this joint hearing. It is unusal for House and Senate committees to meet together. I have long felt that this was an approach that could save us all a great deal of time and safe the representatives of the Executive Branch a great deal of time if we did more of it. So I think this is a splendid precedent.

I would also like to say that I think the Commission, the chairman and the members of the Commission, have performed a great service for the country and perhaps for the world community which is interested in nuclear safety problems. I haven't had a chance to go over the report in detail, but the extent I have been able to go over it, I think I agree with about 95 percent of it, and that proves to me it is a very wise report.

I do have some questions, as Chairman Hart indicated he did, about the recommendations with regard to the setup for the Nuclear Regulatory Commission. My own feeling about that is I agree fully with the Commission that there has been a mindset in the NRC, but I think the problem lies particularly with the staff, most of whom are holdovers from the old AEC. I think there is a lot to be said for the multimember commission at the top of the structure. So I will be pursuing that in my questions.

But I do want to say I think you performed a great service for all of us, and I commend the Commission. Thank you.

Thank you, Mr. Chairman.

Senator Hart. Thank you, Congressman.

Senator Randolph.

Senator Randolph. Chairman Hart and Chairman Udall, in absentia, I want to take this moment personally, rather than speaking for the Senate Committee on Environment and Public

Works, to indicate that I think this session and possible further sessions with members of the United States House of Representatives is wholly meaninful and timely. I feel often that we could come together on matters that are very crucial to the passage of legislation or oversight hearings from both side of the Capitol. We sometimes, I think, are not together as often as we should be. But the remarks I make are in a longer version and these are available.

I commend the President's Commission for its work. Its report will be helpful to our committee, the subcommittee, hopefully to all, as we have an evaluation of the Three Mile Island problem in the conduct of legislative and oversight responsibilities. I heartily stress these points. The basic question is how to create a regulatory structure that establishes precise responsibility for the safe operation of nuclear power plants; second, for the Congress to move forward with corrective legislation that was an obvious need soon after the Three Mile Island accident. The limited ban on the construction of new plants is certainly an example. Third, the reorganization of the Nuclear Regulatory Commission from a five-member body to a one-member single administrator is meaningless without other and more fundamental changes in the regulatory process itself. The greatest need is to determine roles and responsibilities and clarify the lines of authority.

Fourth, I am concerned that the President's Commission did

not address -- and I am not a carping critic -- the issues of disposal of nuclear waste, which is crucial to the recovery of the Three Mile Island plant and to the future of nuclear power in general. I have introduced legislation, as my colleagues in the Senate know, on this subject. It will be thoroughly considered in the subcommittee and committee.

Again, an appreciation to our co-workers from across the Capitol.

Senator Hart. Thank you very much, Senator Randolph.

Congressman Weaver of Oregon.

Mr. Weaver. Thank you, Mr. Chairman.

As chairman of the Three Mile Island Investigative Task Force appointed by the Chairman of the Interior Committee, I arrived at one fundamental question, and that is can we control this force or does it control us? That is why I was much interested in your report and how you dealt with this problem.

It was clear to me anyway that the operators of Three Mile Island at the time of the accident were overwhelmed that a nuclear plant is so technologically cumbersome. There were a hundred alarms in the first minutes of the accident that the operators certainly made errors. But they made errors not because they were incompetent -- I found them highly competent -- but because the technology was impossible for them to grasp at the moment. I say something is fundamentally wrong

with the technology. With the aversion, problems and horrors that nuclear holds, the very fact that great numbers of our people -- and perhaps a majority -- oppose or fear nuclear power should be enough to prohibit nuclear development. We are concentrating the very material most dangerous to life, indeed most threatening to the existence and procreation of humanity. I hope to develop these question.

Thank you very much.

Senator Hart. Senator Moynihan.

Senator Moynihan. Thank you, Mr. Chairman.

Mr. Chairman, the public never says its thanks very well. I would simply like to say to the Commission thank you.

Thank you.

Senator Hart. Thank you, Senator.

Congressman Markey of Massachusetts.

Mr. Markey. Thank you, Mr. Chairman.

I want to thank you also for the effort and time that you have committed to this work. Many of your recommendations are going to be very useful to the committees that have jurisdiction in the House and Senate over drafting legislation in the aftermath of the work you have done.

But, quite honestly, I am very disappointed in you. I am disappointed in the way that finally you concluded with a whimper and not a bang. You did not follow the logic of all of the recommendations that you present to this committee. You

reached the point at which a moratorium was called for. You tell us that the Nuclear Regulatory Commission is in a shambles. You tell us you cannot guarantee the public safety is adequately protected. You tell us that operating procedures, the training of personnel, that there are design defficiencies present in the nuclear industry, and yet you do not have the courage of your convictions. You don't have the ability to come before us today and tell us that you do indeed recommend a construction permit moratorium.

You have concluded, for example, that to prevent future accidents as serious as TMI fundamental changes will be necessary in the organization, procedures, practices and attitudes of the NRC. You have said with its present organization, staff and attitudes, the NRC is unable to fulfill its responsibility for providing an acceptable level of safety for nuclear power plants.

The Commission has further noted that an accident like Three Mile Island was eventual and inevitable and, moreover, those fundamental changes are necessary to prevent future accidents as serious as TMI. You have concluded the accident was a result of operator training and procedures and the failure of NRC and industry to respond to clear warnings from earlier accidents. You blame operator error, the utility, the reactor vendor and NRC for the serious accident.

Now as the House author of the construction permit

moratorium, I can't help but say I have a proprietary interest in seeing a permanent recommendation from your Commission would be forthcoming. Our committee voted 32 to 7 in favor of a construction permit moratorium. You people have been charged with that responsibility over the last six months to come forward with recommendations to us. I think to the extent you did not give us that your report is tragically flawed and limited. It detracts from the recommendations you make to us here. You are asking us basically to say there is something wrong with the automobile, but rather than recall it we are going to try to repair it while it is still moving. I don't think that is a wise and logical conclusion from the recommendations which you make to us today, and I hope as we go forward here we might be able to elicit from the individual members what their reasons were for being able to reach some kind of conclusion. I know at one time there were at least eight members that supported some kind of moratorium to tell the American people that we have to end business as usual, the status quo, and have a moratorium on new nuclear power plant construction in this country.

Thank you, Mr. Chairman.

Senator Hart. Thank you, Congressman.

Senator Domenici.

Senator Domenici. Well, Mr. Chairman, that is another way to say thank you. I might just say if you had asked us what

we wanted individually, you would never have recommended anything to the American people. So I am glad you recommended what you feel is in the best interest of the country. Perhaps it is not what some of us want.

To my mind, Mr. Chairman, the report is an objective analysis by distinguished Americans with no axe to grind. It deserves more than rhetoric by this group and Congress. It deserves intelligent study and action.

As I see it, the report highlights two things. First, that the utilities are operating in a horse-and-buggy age when the nuclear age has arrived. They must update their management practices to the level of our country's overall level of management expertise and competence. Secondly, the Commission found that the Nuclear Regulatory Commission is a rickety regulatory structure with little emergency response capability.

We -- I mean we, the Congress -- must now follow through with the Commission's recommendations to upgrade and update the NRC. In my opinion, we can no longer afford to have a Commission which is fashioned after a group which regulates trains and trade. This requires one to regulate the nuclear industry. It must be able to analyze and react to accidents as well as regulate, and it will not work if we model it after a commission that is in charge or setting rates for airlines or that finds fault with certain American trade practices.

It appears to me you are significantly correct in analyzing

time for a change is here, and you have told us how. Thank you very much.

Senator Hart. Thank you, Senator.

Congressman Kostmayer of Pennsylvania.

Mr. Kostmayer. Thank you very much, Mr. Chairman.

I join my colleagues in the House and Senate in thanking you for the hard work that you have put in on this task. Whether we agree or disagree, it is to be commended for the time you have given the citizens of this country.

The report seems to be important not because of the questions it answers, but because of those it doesn't answer. More important, it seems to be contraditory in a way. The Commission states its findings "do not, standing alone, require the conclusion that nuclear power is inherently too dangerous to permit its continuation and expansion as a form of power generation." On the other hand, the report states that its conclusions "do not suggest that the nation should move forward aggressively to develop additional nuclear power." We could stand still or move forward.

If the regulatory agency and process is as flawed as the Commission suggests, how can we possibly proceed until the Commission's recommendations have been implemented? The report is an indictment of both the NRC and nuclear industry. But the report deals exclusively with future actions and recommendations. What about current operating reactors? And

what about those plants that are located in or near major population areas -- in suburban New York City, in Chicago, in Cleveland, in San Diego? What assurance can be given today to the American people that their safety and health are not in danger?

A final point. If this report demonstrates anything, it is that Congress and the Administration and NRC and industry have been negligent, and that they have ignored the imminent danger associated with harnessing nuclear power for commercial use. Only a short time ago, in fact, the House rejected an amendment which would have required that new licenses be contingent upon the state-developed evacuation plan. This is not a recommendation of the Commission, but it was overwhelmingly rejected by the pro-nuclear House. Clearly, the Federal government and industry have been on the wrong side of the issue. Hopefully this report will put them on the right side.

Thank you, Mr. Chairman.

Senator Hart. Thank you, Congressman.

Congressman Vento of Minnesota.

Mr. Vento. Thank you, Mr. Chairman.

I would like to commend the members of the Three Mile Island task force for their efforts in dealing with this complex issue.

As a member of the House Interior Committee Task Force, I

am familiar with the events that occurred here. But the complexity of the issue which occurred, while your report will be most useful during the consideration by the Congress and the President of our national energy policy, it is not a definitive study of nuclear power and its future limitations. The directive of your Commission and the time frame under which you worked limited the scope of your review to key questions. Disposal of waste, liabilities for accidents in the future at existing or new power plants weren't undertaken.

This is certainly not the final chapter on Three Mile Island. We still face many questions. What is the full economic impact of the accident? How is the waste to be disposed of? What are the full impact of Three Mile Island on the health of the residents? These questions cannot be adequately answered at this time. In fact, it will take years of close evaluation and study before we do reach final decision.

While I have not had sufficient time to read completely your report, there are several issues that come to mind that were inadequately considered by the Commission. I would like to raise these issues and hope you will respond by comments during your testimony.

The report states human errors occurred at Three Mile Island. Such problems did and do continue to exist. It was mechanical problems that led to the event and the design and location of the instrument panel that contributed to the crisis.

Until a thorough redesign of the mechanics of nuclear power plants is completed, the possibility of similar events occurring remains very much.

The last point, I would just like to point out this answer to the question is being begged. We must look at the plant design, operational procedures and basic current facts, the way things are in the real world. Mr. Chairman, the question has not been considered by the Commission or Administration nor by Congress. But we must develop an answer with regard to new nuclear power policy. It is an issue that can no longer be avoided.

Thank you very much.

Senator Hart. Thank you, Congressman.

Congressman Huckaby from Louisiana.

Mr. Huckaby. Thank you, Mr. Chairman. I shall be extremely brief.

I, too, would just like to say thank you for the time and effort that you have given our Nation. I am certain that you addressed many, many questions to various degress that are not really included in your report. I know the issue of a moratorium had to be discussed for many hours. And I, personally, feel that, in effect, we have a moratorium until Congress further reacts.

Just my brief review of your report, I was disappointed that there was not more emphasis on standardization as far as

future plants were concerned. At the proper time, I would like to explore that.

I want to commend you on your efforts in these matters.

Thank you.

Senator Hart. Thank you, Congressman.

Senator Stafford.

Senator Stafford. Thank you very much, Mr. Chairman.

It is a privilege to be here today and I look forward to participating in this hearing on the report issued by the President's Commission on the accident at Three Mile Island. As ranking member of the Senate Environment and Public Works Committee, I would like first of all to welcome the Kemeny Commission to this hearing. The Commission was given a monumental task to complete in a short period of time, and I commend Chairman Kemeny and the members of the Commission for the excellent work they have done in carrying out this mandate. I know the information they have gathered will be valuable as we continue our own investigation on Three Mile Island. The events at Three Mile Island on March 28th cannot

The events at Three Mile Island on March 28th cannot be viewed as an isolated incident. The complicated combination of human and institutional and mechanical failures caused the accident at Three Mile Island. Serious problems raised by the accident have national implications. The solutions to these problems, if they exist, will be complex and will need to be

directed toward human failure, institional failure, mechanical failure.

There is a theme throughout the report. It appears that fundamental changes will have to be made if the generation of nuclear power is going to continue -- changes in the functioning of NRC, changes in emergency planning, changes in operator training, changes in attitude. I, too, believe that fundamental changes must be made. The question is what those changes should be and how they should be implemented? The Senate Committee on Environment and Public Works will continue to look carefully at this question during the next several months. The report issued by the President's Commission is a substantial contribution to the information available on the incident at Three Mile Island.

Thank you, Mr. Chairman.

Senator Hart. Thank you, Senator Stafford.

Congressman Moffett, the chairman of the House Government Operations Subcommittee on Environment, Energy and Natural Resources.

Mr. Moffett. Thank you, Mr. Chairman. On behalf of the members of my subcommittee, we would like to extend our appreciation for your having invited me to make a brief statement and attend these hearings. It is good to see the House and Senate working together. Senator Domenici and I, or course, spend time doing that on conference committee, and I

think we ought to do much more of that. So I commend you for this kind of coordination.

I simply want to say that, in addition to thanking you, I must express my envy for any group that gets a chance to focus on one subject for six months. I think all of us would be envious of that kind of opportunity.

Secondly, having had the chance to speak with the chairman of the Commission and members of the Commission, I have nothing but highest regard for your work and dedication. I think that many of the issues that you have raised are importants ones and can go a long way toward improving safety at existing nuclear power plants. Many of the issues are those that have been raised by the subcommittee which I am privileged to chair, have been raised by both Representative Udall and Senator Hart in legislation that they have introduced with regard to emergency planning and siting and operator training and presence of the NRC at facilities.

I must say, however, that I would have preferred that you had put more bite and teeth into your recommendations by having approved a short-term moratorium if, in fact, the recommendations are not improved. In our own report on emergency planning issued in August, we suggested that existing plants be given two years to have proper evacuation and other emergency planning procedures implemented, and if not, that they be shut down. This is not really your burden. But the

fact is that the central question so many Americans, whether they are in protests or in schools or in gatherings of scientists, want to know is whether we can begin to push ourselves away from the nuclear table.

I appreciate the fact that the Commission only had six months, that it did its absolute best in confronting these issues, that it was one that worked very hard and did with a great deal of sincerity and honesty. But the fact is we are still confronted with the very legitimate question is there another way, a better way? Is there a way to proceed with a energy future with reduced dependence on nuclear power? I would submit that there is. And as we consider at this moment on the House Floor some fast-track legislation, my hope is that your recommendations will be taken seriously, that they will be implemented almost in toto, that we consider them seriously, but that this report not be considered a fast track for accelerated development of nuclear power in America.

Thank you, Mr. Chairman.

Senator Hart. Thank you very much, Congressman.

Congressman Cheney of Wyoming.

Mr. Cheney. Thank you, Mr. Chairman.

I would like to join with my colleagues in thanking the members of the Commission for the effort they obviously expended on a very difficult task. It seems to me just from what has transpired in the last 24 hours, both advocates and

rejectionists have used your report to buttress their preconceived notions of what we should do. I think our purpose would be best served by listening to you.

I yield back my time, Mr. Chairman.

Senator Hart. Thank you, Congressman.

Congressman Symms of Idaho.

Mr. Symms. Thank you, Senator Hart.

Members of the Commission, I share with all my colleagues in thanking you for your efforts. I might say further, Dr. Kemeny, it appears your ability to harmonize several diverse points of view into a very readable report is certainly commendable, and I congratulate you for that. I believe that your work is going to contribute to a great deal of information that has already been gathered in the development of what corrective action may need to be taken by the Congress. And we are all indebted to you for helping us in corroborating good evidence. It complements a good deal of work that has been going on both in government and industry since the Three Mile Island accident.

About three or four weeks ago, I proposed to our House Subcommittee on Energy and Environment, of which I am ranking Republican member, that we develop a report to present a summary of the 17 days of testimony that was taken before our subcommittee. We heard testimony on issues related to nuclear power that were not covered, nor intended to be covered, by your

work, and the information gathered in these hearings clearly must play an important role in the development of any legislation that we would propose.

I would like to note also that the nuclear industry has concurred with those recommendations that you have made to industry, and I believe this acknowledgement is the first step of a new beginning that we have embared on. As I am sure you are all aware, the nuclear industry has proposed in hearings before our committee to establish several new industrial bodies, namely, the Institute of Nuclear Power Operation and Nuclear Safety Analysis Center. These two groups alone comprise in excess of 250 people dedicated to implementing many of the recommendations you have made in your report to the industry.

Now, of course, the Congress must undertake to do these things which can only be acccomplished by legislation. These considerations must be based on the diverse bodies of information that is both well corroborated and substantiated.

Recently, I think it is well to note, in closing, that the General Accounting Office issued a report to Congress that demonstrated at least to my mind that both the immediate and future need of nuclear power for the well-being of this Nation. Those of the upcoming generations who have claim to the future of America will not be served if we fail to provide for them. I hope that the result of your work and this body

we will be able to do so in a responsible fashion because also I would say, in my opinion, the nuclear industry does not need subsidy from the government, but it does need sponsorship if it is going to be successful and a future part of our national energy needs and wean us from dependence on foreign oil. I think furthermore most of our problems with respect to nuclear power are political problems and not technical problems that cannot be worked out. So I look forward to hearing your report. Thank you again.

Senator Hart. Thank you, Congressman.

Congressman Carr of Michigan.

Mr. Carr. Thank you, Mr. Chairman.

I would just simply like to thank the Commission for their labors, and I would associate myself with the remarks of Chairman Hart and Chairman Udall.

Senator Hart. Thank you.

Dr. Kemeny, welcome to Congress. You obviously have generally the commendation of these committees, and I would only add my word of thanks to all of you for the work you have done diligently, and particularly to your fine professional staff. You have heard a lot of what you did not do. Now we would like to hear what you dod do.

STATEMENT OF JOHN G. KEMENY, CHAIRMAN, PRESIDENT'S COMMISSION ON THE ACCIDENT AT THREE MILE ISLAND (ACCOMPANIED BY: HON. BRUCE E. BABBITT, COMMISSIONER; CAROLYN LEWIS, COMMISSIONER; PATRICK E. HAGGERTY, COMMISSIONER; PAUL A. MARKS, COMMISSIONER; CORA B. MARRETT, COMMISSIONER; HARRY McPHERSON, COMMISSIONER; THEODORE B. TAYLOR, COMMISSIONER)

Dr. Kemeny. Thank you very much, Mr. Chairman and distinguished Members of Congress. May I first of all say I am only sorry that all 12 members of the Commission could not be here. Because of the hurriedly planning for these hearings, four of them are unavoidably absent today because they could not change their plans.

We are delighted to be here. I have thought very hard since yesterday about how I could best help you. It is inevitable that within the first 24 hours of release of a highly comprehensive report the spotlight is going to focus on a very small number of issues -- and they were major issues. Therefore, we have no complaint. We thought we might help by giving a brief initial statement where I might try to underline a number of other recommendations we consider at least as important as those that have been spotlighted so you have a more balanced picture in front of you.

First of all concerning the Nuclear Regulatory Commission, naturally, the great coverage and discussion was on our unanimous recommendation on the restructuring of the agency; but that has to be read in the context of the remaining recommendations of the Nuclear Regulatory Commission because it is the rest of the recommendations that speak of the kind of agency we are looking for. The restructure is a means to an end to achieve those goals.

We have recommended the following, as an example: we have recommended they should clearly explain to Congress, the American people, their safety cost trade-offs, that there should be a ground rule for them if there is any doubt at all; that is, unelss the cost is absolutely overwhelming, the presumption should always be in the favor of safety.

We have recommended a new higher standard for any utility that wishes to obtain a license. This is one of our most important recommendations: that they should not be allowed to receive a license to operate the plant unless they meet much higher standards than are now required.

We have recommended that this agency must have a public agenda for rule-making. Most importantly, this must include clear and specified deadlines for resolution of all generic safety issues, some of which have been around for a very long time.

We have recommended very extensive changes in the arm of

the agency through which it carries out its mission, the Inspection and Enforcement Office. This has to be strengthened vastly and it must be provided with a system for evaluating the patterns of problems that show up in nuclear plants. We found no evidence that any such system exited prior to Three Mile Island. Therefore, clear patterns of trouble were not spotted.

We also recommended that there should be periodic, intensive reviews of the licensee to see whether they are fulfilling the terms of their license.

A second area is the area of siting of nuclear power plants, and I will begin with remarks on emergency planning and response.

You have, of course, heard that we have recommended that, as far as feasible, they should be sited at locations remote from populated areas. But we have recommended a good deal more than that. We feel that siting and emergency planning must go hand-in-hand, because one test for a site is whether it is possible to have realistic emergency planning. We have found the NRC-based criteria on concentration of low population zone has proved to be totally flawed in the light of the experience of Three Mile Island. Therefore, we have recommended a quite different approach under which a number of accidents in areas have to be analyzed for each plant to have realistic plans of how you would respond to specific kinds of

accidents. The NRC had analyzed the horrendous accidents and came out with a two-mile zone. We experienced a much less serious accidents and there are recommendations to have evacuation as far as 20 miles. But what we need for emergency planning is clear plans in hand that if an accident should occur, one knows this calls for plan number four, which may be evacuation within a small area, protection measures beyond that and perhaps staying indoors for 24 hours in a larger areas. We recommended if such clear plans do not exist, the plant should not be licensed.

As you know, we identified operator training as sort of an Achilles heel of this particular industry. There has been data from the industry that the particular plant had a way above average reocrd in terms of the NRC examination for their operators, and our evidence agress with that. Yet we heard from those very same operators that they felt that their training left them totally unprepared for the accident they faced. When you put those two facts together, that these operators were above average nationally and totally unprepared for the accident they faced, we feel one of the most urgent needs is a totally new approach to the training of operators. What we are recommending is that operators first go to an accredited training institution where they would learn the fundamentals of nuclear power plants rather than just on-the-job training. It is only after they have proved they understand

the fundamentals would the utility be able to hire them and give them on-the-job training of running particular plants.

We have recommended several vital additional studies, knowing that in six months we cannot possible resolve all issues. I will mention a few of those: an expanded an much better coordinated research effort on the health effects of radiation. Secondly, a careful review of all the equipment problems for handling such accident, particularly to provide better, more easily available and prompt information to the operators and their supervisors which would, of course, involve redesign of control rooms. Thirdly -- and this has received almost no attention -- in-depth studies of accident scenarios.

If I may make a personal remark. One of the things that really horrified me about our investigation was that in the midst of this threatening accident, the Nuclear Regulatory Commission had to call all around the country to find out whether a hydrogen bubble could or could not blow up in a reactor. That research should have been done years in advance and should have been available for just such an eventuality.

Fourthly, a piece of good news -- which you may not have spotted in our report -- which I would like to underline. About the most dangerous radioactive substance is radioactive iodine. While other things got out of containment, almost none of the radioactive iodine escaped. We strongly urge that somebody conduct an in-depth study of what happened here,

because understanding it may help us in other situations.

I am down to my final point, Mr. Chairman, the question of a moratorium -- and you will no doubt ask a great many questions about moratoria. I would like to comment I don't think the impact of our recommendation number eight on the Nuclear Regulatory Commission has been fully appreciated at least by the public news media. This recommendation, which was unanimous by the Presidential Commission, that no new licenses of any form -- either construction permits or operating licenses -- should be issued unless three things happen, we recommeneded that for each of those licenses the NRC, or its successor, must first check three things: first of all, whether the new safety improvements that we have recommended, and other may recommend, have indeed been incorporated in that plant; secondly, that the licensee lives up to the new high standards and qualifications that we have recommended, including the ability to give first-rate training to operators; and thirdly, that any such license should be conditional on the approval of a state and local emergency plan.

We know at this moment this is in the hands of the present NRC, but we hope that this recommendation will be taken very seriously, because if it is -- and Congress could give us a great deal of backbone -- if it is, it may be our single most important recommendation.

Mr. Chairman, Members of Congress, with those brief

remarks, the Presidential Commission recommends our report to you fully, knowing that what happens to it is in the hands of the Predient and the Congress.

Thank you.

Senator Hart. Thank you, Dr. Kemeny.

Under the ground rules we have previously established, we will now invite individual members of the Commission to make brief comments as they may desire. Dr. Marks.

Dr. Marks. Senator, I would like to join in thanking you and other members of Congress for scheduling this hearing so promptly. It clearly indicates a commitment to an expeditious and thorough evaluation of this Commission's report, which is what we can hope for.

I would like to address my remarks to certain of the findings which I believe led to recommendations that can and should be implemented as promptly as possible.

As you know, I am a physician and educator. By training and experience, I would be expected to be particularly interested in the practices and procedures related to people and especially as they affect worker and public health and safety. It is unthinkable to permit a poorly trained surgeon, working in an inadequately maintained operating room to perform an operation. Frankly, I was not prepared for what the Commission found. The Commission identified technical problems with respect to the design and function of certain components of

of equipment. In general, however, the equipment functioned as designed. The equipment failures and the weak features in deisgn of equipment which were identified, however important, do not seem to go to the heart of the concern as to what has to be done to assure safer operation of nuclear power plants. It is the findings with regard to widespread inadequacies in personnel programs and practices that were most disturbing that should be of greatest concern. These inadequacies were found at almost every level that the Commission investigated in relation to the accident at Three Mile Island.

There has been inadequate attention to the human factor, and this is illustrated by the findings of the Commission you have before you, and I will not now take time to review. But I would like to say that perhaps the most fundamental nature of these changes must be the incorporation, in a systematic manner, of higher standards for the selection, training and practice of personnel at all levels of responsibility in the Federal regulatory agency and in the nuclear industry. However important it is to establish adequate techniques to deal with emergencies and to mitigate the consequences of accidents, our primary goal must be to prevent emergencies, to prevent accidents. It is unlikely that any amount of regulations will be adequate to eliminate human errors. Indeed, too much emphasis on regulation may be counterproductive in this regard.

A number of the recommendations of this Commission can be

implemented without new legislation. An emphasis on safety as an integral part of the day-to-day activities of regulators, managers, supervisors and operators can be achieved as a matter of style, and substantive changes in certain procedures and practices can be implemented forthwith. Standards for licensing and relicensing of operators should be based on high criteria of performance, both on theoretical material as well as in practical, simulated settings of the control room operation. Operators should receive a passing grade on all parts of the examination to qualify to operate a reactor. More attention should be devoted to writing review and monitoring of the plant procedures.

On-site plant maintenance should be rigorous. NRC inspections of the power plants should be carried out periodically and with meticulous care to detail. Improperly functioning equipment should be attended to promptly. Lessons learned from an accident should be analyzed and information generated by such analyses appropriately and promptly applied.

We must move promptly to ensure that everything that can reasonably be done to improve the safety of nuclear plants is being done if we are to receive the public support for the nuclear option that we must have to go forward with it.

Senator Hart. Thank you, Dr. Marks.

Other members of the Commission? Mr. Haggerty.

Mr. Haggerty. Although there is some danger to calling

attention to two specific recommendations of oversimplication or making you think they are more signifcant than they are, I think there are two of the recommendations which will bear on how confident we can be as to avoiding the kinds of things that happened at Three Mile Island. One is relatively short-term, the other is long-term.

The first of these recommendations is under technical assessment. The first recommendation under technical assessment is on page 27 nad it calls for the creation of a single panel of significant indicators relating to the conditions of the reactor nad its total coolant system, including the pressurizer. The absence of something as simple and straightforward as that both demonstrates an inadequate attention to the overriding deficiency that caused the accident -- it relates to the change of the people -- but it also would have prevented it. It would have been impossible to have that accident if the pressure and temperature conditions had been clearly portrayed as they were occurring in the reactor coolant system.

Furthermore, if the warnings associated with that had been grouped on a single panel and distinctive from the others and if, as we recommend, there had been a second such panel in the supervisor's office, it is almost impossible to conceive that the conditions which existed could have been missed.

The second is a recommendation which appears on page 66, and it is recommendation 11(b). It calls for the creation of

an overall quality assurance system, one which evaluates the behavior of what happens in these plants. Now the fact is we now have enough plants and we have enough years of operation going on and we have enough identifiable accidents so that if a proper attention is paid to the total action and if they are described and identified properly, one can develop, as is common practice in complex situation, a quantifiable quality assurance system which will relate the status of the industry as a whole in terms of the number of such incidents that per reactor year of operation is going up or down, and one can relate the technical programs related to both improving operators' training and performance and equipment itself to the things that are happening in the system.

There is no particular reason for scaling these machines up. They are still fundamentally the same machines as smaller machines. There is nothing inherent as being a thousand megawatts that makes it worse than 500 or 400. What is wrong is the absence of a comprehensive way of looking at the total system and of identifying the specific and important signals that are related to whether the reactor is behaving properly or not.

Senator Hart. Thank you, Mr. Haggerty.

Any other brief comments? Dr. Lewis.

Dr. Lewis. Thank you, Senator.

We have had many of these arguments inside the Commission

and Pat and I are always on the opposite side of the fence.

I think what you are looking for from us, you have our report and findings and recommendations, and I think at this point you seem to be looking to us for our personal views of where do we go from here? There were a lot of questions we did not deal with in this Commission. For example, how safe is safe enough? Hwo do we get from this point to the other point? So I would like to give you some of my personal impressions.

I came to the Commission with no knowledge at all about nuclear power. I did a tour of Harrisburg, of the Three Mile Island No. 1. I was rather horrified to find we had these large pipes with rags around them and yellow markings on the floor which said "Contaminated Water." I had had an image of a high, clean technology that was well looked after and well run, and I found something that really, frankly, looked like the underside of a hundred-year old house that I once owned, which was the plumbing underneath with all the little knick-knacks there. It was not high technology.

As the Commission progressed, we found a lot of things that showed the whole operation was not run very well. The thing that really struck me was the admission by those on our Commission who knew most there is no way to make nuclear power failsafe, that the only way to make it failsafe is to turn the reactors off. That means we are going to have to live with the

possibility that there will be an accident as long as we have nuclear power operating in this country.

Now perhaps we are willing to accept those risks. But I think what we need is a public dialogue on what the risks are in relation to the benefits. And I think the thing that Congress can do for us is to offer a look at the alternatives. Is there some other way to give us the electricity we need, for example, in conservation, in alternatives sources of energy? The presumption is we have got to have nuclear power. That obviously was outside the mandate that we had from the President, but certainly our deliberations make me thing I would rather have another way to have our electric power. I think conservation is something we ought to try in this country. So knowing that out there is this possibility no matter how much we play with the equipment, no matter how much we try to make the people who supervise it and people who run it better, there is always going to be a risk of an accident. And when you have a look at the possibility of that accident and what it would mean in human terms, not only to this generation but future generations, I think what the Congress and President can do is say, "Let's have another look; let's see if we can find another way to solve our energy problems," and not to really run off in a panic because we have problems with OPEC, but let's look at whether there is another way.

That is a personal view. I know people like Pat probably

won't agree with me. This is what I got from six months on this Commission.

Senator Hart. Thank you, Dr. Lewis. Mr. Taylor.

Mr. Taylor. Mr. Chairman, I would like to focus very briefly on the second recommendation, and that is for the establishment of an oversight committee on nuclear reactor safety.

The purpose of that recommendation, with very little debate, which was unanimously approved by the Commission early on, was to perpetuate a process to which the nuclear industry and the regulatory process has never been subjected before in the history of the program in the United States, and that is careful, thorough public scrutiny. The purpose of that oversight committee is to examine and report to the President, the Congress, and, therefore, the American people in plain English what has been the response of the indsutry, of the regulatory process, whether it is a new agency, whether restructuring of the old one, and to allow the political process, on which everything of major importance in this country depends, to work.

The first requirement for that system to work is knowledge of the true situation with respect to any issue. We have not had that knowledge prior to Three Mile Island.

I stress that recommendation because I want to express a personal opinion. If that is not done, I begin to have some

serious questions about placing all the regulatory responsibility under the authority of one person. If those are couched togeher, then the arguments for the collegiate process I think still hold -- they are strong arguments. Now if that process were in place, with oversight to the whole system -- not just the NRC, but the industry itself -- then I think we have really got something that the public needs. We need a time of probation for the nuclear industry and we need to have a probation for the public political process to determine whether ot not the delinquent should be kicked out of school or allowed to continue.

Senator Hart. Thank you, Mr. Taylor.

Other Commission comments? If not, then we will go to questioning. Under the procedures established by the staffs of the two committees, we will alternate on a 10-minute basis.

To begin with, Dr. Kemeny, if, to use your phrase, the NRC siting policy is entirely flawed, as you stated -- and you were referring to the low population zone aspect of that policy -- how can the Commission not call for a moratorium on new construction permits for plants until that flawed policy is corrected?

Dr. Kemeny. Mr. Chairman, if I may state what happened to us which is now a matter of public record. Eight of the twelve commissioners, myself included, voted for at least one version of a moratorium. Our difficulty was agreeing on common

criteria on what would terminate such a moratorium on new construction permits. We were able to agree unanimously on recommendation number eight, as we said. The problems that come out is that it is easy to say "Start the moratorium," but we were unable to get a majority vote on how to terminate one.

For example, personally -- I am not aruging I was right or wrong -- I, personally, favored one that is tied to the President and Congress having the chance to review our recommendations and act on them. Other commissioners wished to tie it to the siting policy. There was one vote that would have had a flat two-year moratorium. We never could get a majority vote agreeing on one set of criteria for terminating a moratorium.

Senator Hart. In other words, you all agreed --

Dr. Kemeny. Eight out of the twelve, Mr. Chairman, favored one of the three votes.

Senator Hart. But you all agreed, or did the Commission agree that the siting policy is, to use your terminology, entirely flawed?

Dr. Kemeny. Yes.

Senator Hart. But you couldn't agree what to do about it?

Dr. Kemeny. No, we had very specific recommendations on what should be done about the siting policy. But the question was -- let me tell you the problem of tying the moratorium to

the siting policy. It happened to be the one I did not vote for for the very simple reason the way the vote was, it would have been the present NRC that would have had the ability to say, "All right, we now have a new siting policy; therefore, the moratorium is off." I may have been wrong on that, Mr. Chairman. That is why I didn't vote fot that particular one, and other commissioners didn't vote for other versions of it.

I must say we did not agree on how to call off a moratorium once it is started.

I wish you would give other commissioners a chance to speak to this.

Senator Hart. These questions are directed to the Commission at large. Mr. Taylor.

Mr. Taylor. I would like to comment briefly. I voted for all versions of specific moratoria, which I believe would require congressional action, for reasons which I think have been given eloquently by a number of members of your committee and the House side.

I do, however, want to emphasize what Dr. Kemeny did, and that is if you look carefully -- and we looked very carefully at the wording, this didn't just slip in there -- at recommendation eight, no more licenses of any kind on existing reactors that are under construction but don't yet have an operating license or those that don't have a construction

permit until certain things have been done, let me focus on one of those things. No more licenses until an emergency plan approved by the state exists. We then look at what we mean by "an emergency plan." How do you get there? You get there by analyses which have never been done, a number of different routes of a possible accident toward the release of radioactive material that would, under some circumstances, give cause for an evacuation. This is a requirement that we set down and strongly recommend, for an emergency plan.

The point I am trying to make is that we are, in fact, calling for what I would call a moratorium on all new licenses until there are certain actions that are responsive to our findings, not arbitrarily cast into some time in the future, although I see some virture in doing that and saying there is meaning -- there is political meaning if nothing else -- to two years or to until such and such happens. But this now applies to licenses under present consideration. So I view that as a very strong, I would call, moratorium which received unanimous and enthusiastic vote in the Commission. There was very little debate about this when we came down on it.

Senator Hart. Mr. McPherson.

Mr. McPherson. Mr. Chairman, I will speak as counsel for some of our absent members. They didn't think they were voting for a moratorium on recommendation eight.

Senator Hart. So the Commission is in disagreement as to

what it actually did.

Mr. McPherson. No, I don't think so. It is just a matter of semantics, in my judgment. One thing that we did in number eight was talk about looking at permits and licenses on a case-by-case basis, which makes it different from a moratorium, which I think is commonly sued in the political arena, which simply means closing her down for a while.

Since you have asked us to tell why we did what we did, I did not vote for either the moratorium proposal that called for that moratorium until you all and the President had had an adequate opportunity to consider our recommendations, including the recommendation to restructure the Commission, because I frankly didn't know how long that was. I didn't know what event -- what is "adequate opportunity"? Does it mean voting up or down? Does it mean three years from next month? I just didn't know.

The other one that came along was a two-year proposal, a moratorium for two years. That didn't have an event involved. You all could sit still and do nothing for two years up here, take no action at all. All we have done is delay for two years any construction permits for nuclear power plants.

The one I recommended is the one that nearly made it, and it comes from what I thought was a natural development from the siting recommendation, the siting recommendation that we agreed to, to my delight. In order to provide an added

contribution to safety -- even if you did all the other things with people and plumbing -- in order to provide an added contribution to safety, the agency should be required, to the maximum extent feasible, to locate new power plants in areas remote from concentrations of population. Siting determinations should be based on technical assessment of various classes of accidents that can take place, including those involving releases of low doses of radiation. My proposal was to say, having agreed to that, now new construction permits should be granted in areas that violate that siting proposal. And I thought it was a pretty good idea, but --

Senator Hart. But it failed.

Mr. McPherson. Yes.

Senator Hart. So in the meantime we have the conclusion that the siting policy is entirely flawed, but no recommendation for us to do anything about it.

Mr. McPherson. It was an extremely difficult and tough technical issues, and it does involve technical deliberations we were not up to.

Senator Hart. But from the Commission's point of view, licenses can go ahead and be issued to plants sited under a policy that is entirely flawed.

Mr. McPherson. Well, we are saying they ought not be near concentrations of population.

Senator Hart. Dr. Marrett.

Dr. Marrett. Let me first explain I was never voting for or against a moratorium. The approach for me was what is the nature of the recommendation we are reviewing? And I reviewed each one of those recommendations that independently all were generally concerned about a moratorium.

My own abstention on the votes -- and I will explain them -- my own absention was based on what I think Chairman Kemeny expressed as a problem of what are the criteria? What are the things to be done? The uncertainties about the number of those, as well as the particular complexity some of the recommendations involved, led me to be very uncertain about the wisdom of those recommendations. Thus, I could not in good conscience say I fully supported a number of the recommendations.

On the other hand, if indeed there was some basis for something beyond -- that some of the arguments that were made did seem, in a sense, to carry with them a great deal of weight, and not being able to reach a conclusion on recommendations, I found it impossible to vote in favor, but neither this, was I neither totally opposed to the idea.

Let me explain where I had problems with reference to the siting acception.

Senator Hart. Excuse me, before you do it, I shall turn the microphone and gavel over to Congressman Bingham.

Mr. Bingham (presiding). Please continue.

Dr. Marrett. With reference to the siting recommendation, and Commissioner McPherson has indicated we certainly have recommended siting in remote areas, it is obvious though that that is a terribly complex issue with reference to what do we many by remoteness. As someone pointed out, what is remote in certain parts of the country in terms of population might not be the criteria in other parts of the country. We certainly would not favor something done far too hurriedly, if indeed it is far more complex than simply having said this should be an idea. It has to be worked through far more substantially than we were going to be able to do, and thus, having been left with these thoughts of certainties, which in part said what is to be done during the period the moratorium is in effect, with those things left uncertain for me, I had difficulty saying that I regard a vote on a moratorium as the most certainly central thing this Commission should recommend.

Mr. Bingham. Mr. Haggerty.

Mr. Haggerty. Since I prepared recommendation number eight, and I voted for none of the so-called moratoria, let me explain why. It seems to me we had to be responsible. What did we look at? We looked at Three Mile Island, Met Ed, B&W, Burns and Roe to a limited extent, and NRC. You know it is easy to talk from one's emotional background as to what ought to be done generally. All we know is what we had looked at. That recommendation says look at every case and weigh it

heavily before you issue another license. But it doesn't jump from emotional commitment and a limited review to a general castigation of an industry as a whole on which we had absolutely no facts to base such a recommendation.

Mr. Bingham. Dr. Marks.

Dr. Marks. I would like to comment on this, too. I supported the recommendation for a moratorium linked to siting. But I do think that although only six members of the Commission supported it, the substance of the intent is in our Commission report and was supported by all of the commissioners, and that is on page 64, item six, which starts off "In order to provide an added contribution to safety," et cetera, which I think Commissioner McPherson referred to before, and I think the comment Commissioner Haggerty just made might have been a factor in why some of the commissioners did not go, if you will, the next step, which several of you are trying to find out why didn't we go that next step? If we come this far, why didn't we go this next step?

I think that I, personally, on the one hand, must respect the fact that we did have a limited mandate and, in fact, we were extrapolating. On the other hand, the basic recommendation is there, and if, in fact, an effective regulatory body accepts and implements that recommendation, I think that we have a very, very strong proposal with regard to siting. And I think that it probably may, in fact, be a moratorium, but at least on a

case-by-case basis it is a very strong recommendation which requires examination of every single license.

Mr. Bingham. Senator Hart's 10 minutes have expired, but go ahead, Dr. Lewis.

Dr. Lewis. I voted for the moratorium, and I am sorry that we didn't get enough votes to come to you today and say we are that serious that we want you to take some action to stop it until everything is fixed. But I think if you do read our deliberations, you will have a sense of the anguish in what we saw. Even as we didn't get the votes, as the rules were drawn late in the game, you do have six votes involved for the moratorium. You have three against and three abstentions. And I think if you just overlook the particular rules we had, you will recognize that is a majority of this Commission in favor of a moratorium. It is up to you to read that. It is not an official statement. But as far as I am concerned, that is a majority of the vote.

Dr. Kemeny. Mr. Chairman, may I have one remark of personal privilege. There has been that particular statement that was just made that the rules were drawn late. May I state for the record that this chairman first proposed rules for adopting the recommendations for the Presidential Commission on August 14th. At that time the proposal was eight votes. At our final meeting, the Commission, having had in front of us written rules, unanimously adopted those rules.

Therefore, I don't think it is fair to blame the outcome on the rules.

Dr. Lewis. Can I answer the chairman?

Mr. Bingham. I think we better proceed. I would like to comment on this matter, and I was about to had Dr. Lewis not spoken.

I would like to say from my point of view, looking at the recommendation eight and looking at the recommendation which appears on page six of Commissioner McPherson's supplemental view, and also the recommendation which is quoted on page one which six commissioners signed, I think it is a fair statement that the impression created by the Commission's report, taking into account the rather rigorous set of rules that it adopted for itself, amount to what appear to me to be a recommendation for some form or moratorium, and indeed a moratorium which might well last substantially longer than the six months, which is the proposal that is before us in the House The voting rule which the Commission adopted for itself is more rigorous than we have in the House or Senate or, for that matter, the Supreme Court.

You had a majority of those voting for two of these recommendations which clearly amounted to recommendations for a moratorium. And I would like to call attention also to the fact that your recommendation eight addresses itself not only to construction permits, but operating licenses, which I think

is a very significant addition. So it is on that basis that I said earlier I felt the Commission had done a tremendous job. And I recognize the difficulty that you had, Chairman Kemeny, in coming to a particular wording that would require the necessary set of votes.

I think it is unfortunate that the media have picked up the fact that the Commission did not vote formally for a moratorium. I don't know how many other reporters picked up the recommendation by the six commissioners, as David Burnham did writing in The Times. But particularly in view of the fact that some supporters of the industry have pointed to this as something of a victory for the industry, I think the result is unfortunate. But from the point of view of the way the Congress will look at this report, it seems to me the significant fact is that eight members of the Commission voted for a moratorium in one form or another.

Now I would like to turn for my question to the recommendation for a single administrator. It seems to me that the problem that this Commission confronts is a very different one from, let's say, the problem confronted by the civil aviation administrator. The problem is much more complex, answers are much more subjective, and it is a protection to all points of view to have different points of view represented on the supervisory body. Now Dr. Taylor has indicated that if the kind of oversight committee was created

that would provide that type of spectrum of opinion; but if it is not provided, if that is not created, there is no opportunity for that. So my quesion is this: how many of you would agree with Dr. Taylro, that if the oversight committee recommended is not established, you should leave the collegial structure at the top of the Commission?

Dr. Kemeny. Mr. Chairman, I believe I speak for the whole Commission. First of all, both were adopted unanimously, and during the discussion those two recommendations were intimately coupled in our mind. Therefore, I think that that is a package deal, that we would not buy one without the other.

May I say one word on that subject, Mr. Chairman?

Mr. Bingham. Yes.

Dr. Kemeny. Unlike a regulatory commission that sets rates, which is primarily judgmental in nature, there is a very large line organization here that must be supervised. Our findings document amply there is no effective leadership of this particular agency. Therefore, we tried to come up with a combination that, on the one hand, would give really strong day-to-day leadership for inspection and enforcement, for rule-making, for making sure things don't fall between the cracks, if I may quote the agency, at the same time keeping what you are looking for in the collegial body by recommending an oversight committee. I don't think we would have voted for one without the other.

Mr. Bingham. Might I ask you to comment on the aspect of this question that arises from the great swing that may occur from one point to the other, and we see that in the Commission today in terms that one presidential Administration may favor one type of appointee and another a different one. As I recall, you recommend a term of years for the administrator; you also specify that the administrator can be removed at the pleasure of the President. Doesn't that permit, in your view, a very dangerous lack of stability in the operations of the NRC?

Dr. Kemeny. That is certainly an issue we discussed at very great length, and we came out at the end with a judgment that it has to be the people who determine what the policy should be on nuclear power. The best place we could tie it to was a national election. If the people elect a President whose platform is to have nuclear power, the people have spoken on that; and if the people vote for one that wishes to terminate it, then the people have spoken on that. Clearly, it is only the President and Congress who can speak for the people of the United States. Therefore, we felt that very fundamental decision should be tied to the judgment of the people of the United States.

Senator Hart (presiding). Senator Simpson.

Senator Simpson. Thank you very much, Mr. Chairman.

Apparently I missed some of the in-depth discussions on moratorium, which you always miss when you walk out of a room

on this committee. We have grappled with that heavily. We have come to some roll call votes on the floor of the United States Senate on moratorium. I recall the vote on the moratorium issue which was just flat out. I think it was 55 to 37 not to call for a moratorium on this industry. I won't get into the various reasons for that, but suffice it to say it was felt that even before Three Mile Island, there was almost a moratorium with a 12-year delay time in the construction of those facilities, with a lead time of, as I say, 12 to 13 years, change orders at any time, siting regulations, which we deeply went into on the floor in the authorization bill, state emergency plans. Senator Hart and I joined in an amendment which required states to have those emergency plans, and if they did not, the construction would not begin.

So it is easy, so easy, in this business that I have been involved in as deeply as the chairman and as deeply as the members of the House committee, so easy to simply reach down in the bag and pull out the title "moratorium," "meltdown," "China syndrome," and the rest of the stuff, and then to get it all clouded in emotionalism and not deal really with the tenacious issue itself. And I hope that I can always stay away from the ritual, which is merely a trial variety here, to slip over to those terms when all it does is cloud reason and common sense.

Enough of that. I have seven minutes left.

Your report identifies a number of events at the Three Mile Island plant and other plants that were in some way related to events of the accident which were apparently unheeded by the utility, the supplier of the system and NRC. If the industry and NRC, in your mind, had in place an effective system for identifying and evaluating these operating experiences prior to this time, do you think that this accident would have occurred if there had been that system of identifying and evaluating between those three entities?

Dr. Kemeny. I believe again I speak for the whole Commission. We are quite certain if any one of several things had been followed through to the end, this accident would have been a minor incident that we never would have heard of it.

Senator Simpson. Your report recommends improvements in the NRC's and industry's efforts to evaluate the operating experience and to try to incorporate those experiences into the design and operation of the plant. What specific means would be helpful to accomplish those objectives?

Dr. Kemeny. I think more in-depth study than we were able to do of actually what happened in this particular accident and what were the factors that prevented the operators from carrying out their task as they should.

Could I perhaps ask Commissioner Haggerty to speak to that because I think he could be most eloquent, and I agree with everything he is about to say.

Mr. Haggerty. Obviously you have the specific incidents, the Davis-Bessie incident, which was an out and out warning of almost the identical set of circumstances which subsequently produced Three Mile Island. But you have a broader problem of how you evaluate the status of the overall industry? How do you measure if you are progressing or going back in that status? Now that we have enough plants and they are operating and have been operating, there are the LARs, the so-called reports on incidents that occur. If they were identified and scored as a part of a system, it would then become possible to measure progress because the statistical base is big enough, and programs which are laid out for improvement of training and equipment could both be related to the progress or failures against that overall quantative measure of what one is doing. You can't have a narrow, purely statistical examination. One has to know that these numbers have a base, what its meaning is. It can only be a guide. But it is almost inevitable if such philosophy existed, there really had been careful examination of these events, had it been coupled into a system of quality assurance, it would have been improbable for the signals at Davis-Bessie and Creswell that pointed to the incidents to have escaped, and hence avoidance of this particular accident.

Senator Simpson. One of the Congressmen brought up the issue of standardization, and one of the things I was interested

in in the report and the work we are doing too was the aspect of the custom-made reactor. What did you address in the area of standardization which might allevaite problems, give us a better handle on the type? Not saying that one supplier then, that they would all come together, erect the same type of facility, but what was your discussion on standardization?

Dr. Marrett. There is a specific recommendation on standardization. I think we need to go back to Commissioner Haggerty's comment about what we did and what fell within our mandate. What we did was actually look at a given vendor, a given plant. For us to extrapolate about standardization from this experience would seem to be far beyond what we have the factual data to do.

One of the other things that I think should be remembered, in our investigation entirely, we were fully aware of the broader kinds of inquiries that are being undertaken here, and we assumed that others will have a chance to ask thos sorts of questions with a broader base than we had based on the part of the industry we looked at.

Dr. Kemeny. May I add one word, and I agree with what Professor Marrett said. We had a very brief discussion on standardization. Let me tell you why, in addition to what she said, we did not come up with a recommendation. I think we all feel if those two plants next to each other had the same kind of control room, it would have happened considering the

fact those control rooms were well over 20 years out of date. I was quoted as saying 20 years. We now know from the most high NRC official, going back 10 years, even he said it was 20 years out of date. What worries me about standarization is it could become a recipe for obsolescence. We thought it would be better to stay clear of that subject.

Senator Simpson. That is helpful, because you referred to it a great deal and you didn't make a recommendation. That was my inquiry.

One other question. Some of the recommendations that you give place a very high priority on prompt regulatory action by the NRC in a lot of areas. For example, you call for development of new siting criteria with population density fed into that determination; prompt review and approval of state emergency plans. You talked about the development of standards for training and qualifications. My question: how will the progress in accomplishing each of those areas -- and I think you pointed out as immediate goals -- how will those be affected by the reorganization proposals for the NRC which you are suggesting? Will the delays which accompany, from what I see, those type of reorganizations be a significant factor in hindering the carrying out of those recommendations with the immediacy you seem to address?

Dr. Marks. This was one of the things that we discussed at length, this so-called transition period. And I think that

the thrust of our recommendations are, to the extent possible, they be implemented by the present NRC. We feel that there are recommendations such as you just cited, Senator, which can and should be implemented now, and the agency that exists is the agency that we hope feels charged with responsibility to do it now. The restructuring of the agency certainly is not a recommendation intended to in any way either remove responsibility from the present agency to go forward with the implementation of these recommendations where it is possible without statutory change, nor hopefully to use it as an excuse for stalling on going forward with these recommendations.

Senator Simpson. Thank you.

Senator Hart. Senator Randolph.

Senator Randolph. Thank you very much.

Dr. Lewis, you are non-nuclear; is that correct?

Dr. Lewis. When you say I am "non-nuclear," I came into the Commission not having a position.

Senator Randolph. What is your position now?

Dr. Lewis. Now I wish we had never gone in this direction. Does that clear it up?

Senator Randolph. Surely, I understand. I hope that you will now be very prompt and very positive. How do you feel about coal?

Dr. Lewis. I know you come from a coal state, Senator, so I think that is a loaded question.

I realize that there risks in using coal, and I am very aware of it. And I know there is a new technology for scrubbers. I was very interested to see recently Vepco has decided to go from nuclear to coal. I think whatever we choose has got a trade-off in terms of health and safety. My own feeling is the ultimate nuclear power, which I hope never happens, is always possible, and that kind of danger is of such a magnitude that I don't personally feel it is comparable to the risks we have in coal with the scrubbers and with the present technology. So my feeling is I would rather not have nuclear.

I also feel we have to think of tomorrow. I don't like the idea of having all the waste behind for our children and grandchildren. I think that we really don't know what is out there in the future when you have some forms of radioactivity that have a half-life of 25,000 years. We don't even know if there will be a United States of America in 25,000 years. Who is going to guard it? What is going to happen then?

I know what you are saying. I know coal has some risk. I am sure our technology can find a way to make the risk less. So I would rather go with coal than nuclear.

Senator Randolph. You are a champion of a good cause.

Dr. Lewis. Thank you.

(Laughter.)

Senator Hart. Whether you knew it or not.

Senator Randolph. Professor Lewis, we do know that not

only we can move from nuclear, but we can move from petroleum and natural gas. We can do it safely and we can do it without danger to health. We can do it now. Conversion of electric generating facilities from whatever source they are now receiving it, they should receive it from coal. There are 34 plants at the present time that can make that change over now. There are 117 installations that can be changed. We would free up then petroleum, we would free up natural gas. And this is necessary to be done. I would not have aksed you this question except that I felt it was important that you yourself had this attitude of caution toward nuclear power, that I might turn toward a positive subject -- coal. And you have addressed yourself beautifully to it and I am grateful. I am not trying to be facetious. I just feel strongly that what we have we should use.

Now the recommendation, Dr. Kemeny, that the national picture, as you see it today, calls for the Nuclear Regulatory Commission to go out of business; is that correct?

Dr. Kemeny. At least to be completely restructured.

Senator Randolph. Yes, restructured. And that would be replaced, as I understand, by an Executive agency with a single administrator; is that correct?

Dr. Kemeny. Yes, sir.

Senator Randolph. Now I think that history does tell us something, usually correctly, that such agencies are quite

vulnerable to policy direction or political influence from the White House -- and I don't speak against the White House or even someone within it or even other Federal agencies. But let's just take a supposition. Suppose the Secretary of Energy or a presidential adviser on the subject of energy, these two individuals, or one of them is very pro-nuclear from the standpoint of development of that type of power. Now is it appropriate, is it fair, to have nuclear regulation subject to such pressures, as I say, might come by what you are suggesting should be the alternative to the Commission?

Dr. Kemeny. Senator, may I respond to that. It was precisely for that reason that our recommendation says in the the single administrator should be appointed by the President subject to the advice and consent of the Senate. It is our great trust in the United States Senate that enabled us to make that recommendation.

Senator Randolph. Thank you very much, Doctor.

When you released your report yesterday -- and again I commend all of you for this. I am not a carping critic. I have checked it rather carefully, and I think you deserve credit. And I think we ought to speak of it more than once at this table.

You have interpreted the situation, I believe, that nuclear power plants are safe operations. Was that your intention? Are they safe?

Dr. Kemeny. I think that is quite correct. It is just the people who run them that are not safe, sir.

Senator Randolph. The plants are safe. It is the people operating them that don't do the job correctly.

Dr. Kemeny. That is correct.

Senator Randolph. How do we get the people to run them correctly?

Dr. Kemeny. That, sir, is the major issue on which the future of nuclear power will depend. If we get the kind of organization with the right attitudes that can run these plants totally safely, as I believe they can be run --

Senator Randolph. You believe that can be overcome, the failure of the operating end of the nuclear power plant?

Dr. Kemeny. I believe it is possible. But it depends on the attitudes and organizational changes that, frankly, certainly not this Commission, nor even the United States Congress, can cure completely, because you are talking about attitudes within the private secton. And I hope the industry has learned its lesson from Three Mile Island to realize its future depends on the adoption of these quite changed attitudes.

Senator Randolph. The central observation in what we call the overview chapter is that because of the inherent risk of nuclear power, fundamental changes in the regulatory programs will be necessary to keep those risks that you highlight within tolerable limits. Now don't misunderstand me. What is the

tolerable limit?

Dr. Kemeny. It is interesting you should pick that particular phrase because its object left considerable discussion in this Commission. What we are saying is that the present situation is not tolerable, and that was sufficient to make that recommendation, sir.

Senator Randolph. So your report, at least with the current operating plants, you see the risks of nuclear power as not being within tolerable limits; is that correct?

Dr. Kemeny. That is correct.

Senator Randolph. That is a fair conclusion, is it not?

Dr. Kemeny. Yes.

Senator Randolph. I think you, Doctor, very, very much. And other questions, if I may, perhaps one or two or three, we would provide in writing with your responding.

Dr. Kemeny. Thank you.

Senator Hart. Thank you. Without objection, those questions will be received.

Congressman Weaver.

Mr. Weaver. Thank you, Mr. Chairman.

I would first like to say, Dr. Lewis, I was very pleased with your remark. Out in the Northwest where I come from, in Oregon, we are building nuclear plants while at the same time we have things like wood waste, which will produce energy for one-half the cost of the energy, but we burn it in the woods.

It is really an insane policy, and I am pleased to hear somebody commenting on the sane fashion.

Dr. Kemeny, your Commission voted unanimously for requiring states to have emergency evacuation plans prior to licensing of a plant. This is an amendment that I sponsored in the House Interior Committee and intend to offer on the House floor when the Nuclear Regulatory Commission authorization bill comes up. I note that in your findings you say that the NRC has not made the existence of a state emergency plan a condition of plant licensing. In your recommendations you say you would want such a plant to be approved and reviewed by the Federal Emergency Management Agency.

Now the House rules are such I am not able to have the Federal Emergency Management Agency as the supervising body. It has got to be the Nuclear Regulatory Commission. The authorization bill is for one year. Would you feel that it would be proper to have my amendment adopted or your recommendation adopted requiring the NRC to do this for one year? Is that something I could tell the House would be acceptable to you as an interim measure to get that into effect?

Dr. Kemeny. I can't speak for the whole Commission. Certainly any step in that direction would be a step that we would favor. As one reason why we didn't recommend FEMA, we felt it is terribly important to take advantage of the existing emergency machinery in each state. Once I said during the

meetings what happens if you have simultaneously a nuclear accident and a hurricane?

Mr. Weaver. I agree.

Dr. Kemeny. Certainly may I say any step in this direction we would favor. I hope you understand why we thought the single agency that really is geared to working with counties and local communities in their response would be the best one to coordinate it, but not naive enough to think every word we recommend would come out of the United States Congress.

Mr. Weaver. But just as an interim measure, would anyone object?

Dr. Marks. Yes, I think on the basis of the discussions we had there would be objection to it on the fact that FEMA does exist and NRC simply does not have the kind of resources to really effectively put together --

Mr. Weaver. Dr. Marks, that isn't the option we have. The option we have is to do nothing for at least a year or have the NRC at least be consulted. See, that is my point.

Dr. Marks. I support Chairman Kemeny's position that anything better than what we now have is a move in the right direction. But I think it would be inaccurate to leave you with the impression that we would be very enthusiastic about that incremental measure of significance.

Mr. Weaver. I understand. We would get it started. And I appreciate your comments.

I would like to explore the question of the operators. In my investigation, our task force investigation, we saw some of the same problems you did, of course; but we felt the operators were simply overwhelmed in the errors they did make, were errors that I don't think anyone in the same place would not have made. We accept it as a flip of the coin. You are not blaming Three Mile Island directly on the operators. Given another set of operators, are you saying Three Mile Island would not have happened?

Dr. Kemeny. Excuse me, may I answer that in more than one sentence. We are not blaming those specific operators because their training did not prepare them for this. We are saying either other operators, or the very same operators, if they had had the right training and right lessons learned from things like the Davis-Bessie incident, it would have prevented the accident. But you can't blame individuals if they do not follow procedures they don't know.

Mr. Weaver. In the first four moves in chess, there are two billion different moves, and in a nuclear plant there are also not a infinite different number of variations of problems, but certainly an extremely high finite number. You are not going to get operators that are going to be able to handle all of these in any given situation.

Dr. Kemeny. Sir, I certainly agree with that. However, here the errors were so fundamental. If I may say, I say this

as somebody who seven months ago had no idea how a nuclear plant worked. I have some science background. It is very elementary you want to keep the combination of temperature and pressure such that the water doesn't boil out of the reactor, and the operators were not trained to concentrate on that and did not realize that when clear signals came on they ought to be pouring in all the water they can.

Mr. Weaver. But there were other signals being send to them that were read the other way very clearly.

Dr. Kemeny. That is correct.

Mr. Weaver. If I have a minute of two left, Mr. Chairman, I also disagree very strongly with another of your findings, and that is that you were able to determine with a great degree of certainty the amount of radioactivity that escaped from Three Mile Island. I find, as a matter of fact, in conflicting statements from NRC employees that some of the deficiencies in instrumentation were such that you couldn't know. You say your staff extrapolates and estimates with a certain degree of certainty. I can't imagine how you could. There could have been a great deal of radioactivity that escaped given the sad lack of proper instrumentation with which to monitor and measure that.

Dr. Kemeny. Could I ask Dr. Marks to address that.

Dr. Marks. Mr. Weaver, you are quite correct that there were very significant deficiencies in monitoring at the

initiation of this accident. To the best of our s
ability to ascertain, data starting at about 12:00
o'clock on Wednesday, March 28th, data largely being
by the Department of Energy but also supplemented by several
other agencies at the state and Federal level, gave what they
considered, in their expert opinion, an accurate estimate of
the radioactivity dose to the area within 50 miles of Three
Mile Island. The estimate is based, therefore, on partial
monitoring during the early hours, fairly adequate monitoring
from that time one, and also a calculation of the total amount
of radioactivity that could have been released from the plant.
Now it is their evaluation that the conclusions which we drew
were based on estimates that are, at best, in error not more
than by a factor of two. Now a factor of two in some areas is
a large factor, but with regard to the potential health effects
in this particular case, I don't think would change our
conclusions.

Mr. Weaver. Thank you. If I have another round of questioning, I want to explore this a little more.

Senator Hart. Thank you, Congressman.

Senator Moynihan.

Senator Moynihan. Thank you, Mr. Chairman.

Dr. Kemeny and Commissioners, may I first express, once again, my appreciation for what you have done and especially the way that you did it. My colleague, Senator Simpson, said

you wrote this in English, and that is a large and considerable achievement. I think that most of you would be very much familiar with the fact that the advent of science has imposed a tremendous task upon people who can translate to the very different worlds that are the scientific, on the one hand, and political, on the other. As you may know, it is not until 1976 that the United States Senate elected a natural scientist to its body. I said to Senator Schmitt he was the first scientist in the Senate since Thomas Jefferson presided, but he wasn't elected.

I am struck by something you said, Dr. Kemeny, which is that the plants are safe but people who run them are not safe. That is a very large assertion, and if you are supportive of nuclear energy a very encouraging one because it is an organizational problem that is almost familiar.

I remember we asked the people who worked at TMI, or asked the Public Service Commission what was the average salary of a man who worked at that control panel. "Oh, they make about $20,000 a year and the plant supervisor makes about $30,000." That is half the salary of an airline pilot. And you can see what has sort of happened. The culture of steam generated public utility plants, being stationary engineering, a technology fully matured a half a century ago, with no real dangers involved -- you could blow up a few people and spoil a generator -- and that clearly transferred to a whole

management system of the utility itself.

Changing it around is not a problem. We had experience with this not very distant in time. Two new forms of transporation, one was an automobile and one was airplanes. Automobiles seemed familiar and safe. Airplanes were obviously not familiar and thought to be not safe. In fact, they are inherently about the same -- they are machines. But the way society approached dealing with safety in airplanes and automobiles was entirely different, with the result that automobiles were absolutely deadly instruments, and continue to be, and airplanes have been relatively innocuous since their outset. It is just your perception of the old saying if you can drive a horse and buggy. Well, the fact is you can't drive a car either unless the systems are worked out. I think we know a lot about that. That is the kind of thing that a command and control mechanism is needed somewhere. Essentially, you have made the judgment it should be an agency. It is a long way to ask you a question.

Could you tell us a litte bit more about your judgment about why the regulatory mode isn't appropriate here? We are supposed to at least know something about that. We know very little about other matters. I haven't fully read the report of chief counsel on that matter, but it doesn't seem to draw very much on the political signs of this subject. James Key Wilson is, I guess, our ranking authority. He has a new book

coming out on regulatory agencies. Could you tell us a little bit about whether you did this guided by judgments of people who studied regulatory processes as against administrative and command and control processed, organizational theory, or did you just decide the present way isn't working very well, let's change it?

Dr. Kemeny. Could I make one brief comment on your first remarks, because I agree. As someone who always sits on airplanes chewing his knuckles, I am extremely happy that pilots get extremely high salaries.

I would like to call attention to one of the recommendations made to the utility on the importance of attracting really highly qualified candidates for positions, and setting salaries adequate to attract those.

Senator Moynihan. If you can consider that taxi drivers have just replaced coachmen, airplane pilots seem to be different.

Dr. Kemeny. I will call on Commissioner McPherson to address your other question.

Mr. McPherson. Senator, your question was whether we had looked at a lot of models when we came to our conclusion that there ought to be a single administrator instead of the present five-man Commission. The answer is yes and no. I think all of us came into it with some knowledge of mixed history, but as the last commissioner to have gone along with this

recommendation, it took me quite a trip to conclude a single administrator would probably be better. The argument I had heard for the five-man Commission expressed by a couple of commissioners was that it gave a superior antenna system for picking up views and criticisms about the agency and industry. In other words, if you have a super-nuke as chairman, then you are likely to have somebody who is sensitive to the anti-nuke and concerns about safety and so on.

We considered that and weighed it against the following. If you indulge me, I would like to read a bunch of single sentences that come up in the depositions of commissioners who presently sit on the NRC.

"Commissioner Gilinsky: I would say that it runs in the way that the collective group wants it to run, to the extent that the majority develops within that group."

"Commissioner Kennedy: I share responsibility with my colleagues and am responsible for the general administration and operation of the organization."

"Commissioner Gilinsky: The commissioners have been very much insulated from the licensing process, particularly in individual cases, which is where most of the ball game goes on."

"Commissioner Bradford: We have very little direct involvement in supervising the day-to-day work of the rank and file Commission employees."

"Commissioner Ahearne: It is certainly true that the

commissioners -- and I guess I would have to include myself too -- are not in what I would regard an immediate, total control and cognizant situation with regard to all the things going on in the staff."

"Chairman Hendrie: I am nominally the chief executive officer of the agency and therefore responsible, in effect, for the whole agency."

Counsel asked him twice, "You mentioned you were nominally in control. What do you mean by that? Do you think you are the chief executive officer?

"In this agency we really don't have a chief executive officer in the sense that Cabinet departments have a head and, for example, the Environmental Protection Agency has a head. We don't have a chief executive officer in the sense that a number of other agencies that are headed by commissions are headed by the chairman where the founding statute for this agency, in fact, gave pretty full administrative power to the chairman. Here we operate very much under a collegial system which derived from the Atomic Energy Act, the original provision which provided that commission, a body of five equal members, with the authorities and power of the head of the agency to preside in the collegial action and not in the chairman."

Commissioner Kennedy, after saying that he thinks it is a good idea of keep the five, says, "I recognize there is a lot of

ineffiency in it."

"Commissioner Ahearne: I have tried many times to think if I were an officer, how would I try to relate having five somewhat equivalent bosses?" He is talking about the agency setup. "It makes it very difficult to decide how to interact with them. I think it is more easy to decide not to."

There are several others. But the point is what we find is that the NRC is not necessarily a mismanaged agency, it is an unmanaged agency. Nobody is running the show down there.

Question: how do you keep getting information, concerns with safety and so on if you have a single fellow and he is a strong, tough administrator but he is pro-nuclear? We tried to resolve it with this oversight committee, with a staff on the outside, the private citizens who would perform that listening role, and that inside we would have somebody who could knock heads together and who could try to get a much better response from the various division of the NRC.

What you have got here is a gigantic management mess, and it is both in the NRC and in the vendors, the people who make the steam system, and the utilities. Take this Davis-Bessie plant that Commissioner Haggerty mentioned. The same type of transient happened at Davis-Bessie in Toledo, Ohio, 19 months before TMI. A young engineer went up from Babcock and Wilcox, which had made the steam system, and wrote a memo and said, "You know there is something wrong with your pressures, or at

least it could be read to give a wrong indication of the water on the core. Maybe we ought to tell the people who buy our system about this." Nothing happened. His boss, a month later, wrong a memo saying "I think we ought to do something about this." Nothing happened. They turned the water back on. Nothing happened. Some fellow who is in another part of B&W wrote a memo and said, "Well, if you turn the water back on, the system might go solid." That sounded like all hell was going to break loose. He asked "What is 'going solid?'" It seemed like a small consequence to a meltdown. But in any event, still silence.

Six months later, two fellows met in the hall over the water cooler. Somebody said, "What about that memo?" The other guy said, "No problem." The guy that said "No problem" meant the concern about going solid is no problem, so go ahead and teach them all that. The other guy thought he meant the pressurizer is no problem so there is no need to tell them.

When the NRC Creswell inspector down below out in Chicago came to the same conclusion about this pressurizer, he thought something ought to be done about, tried his best to do something about it, was a pain in the neck to a lot of people, and finally went tp see a couple commissioners of the NRC, using their open-door policy. Five days before the accident at TMI a guy from TVA who was familiar with Babcock and Wilcox plants sent a memo to the NRC saying "Do something

about that." Nothing was done.

When do you throw up your hands and say something can't run any better? Our judgment was if you had someone who endorsed a policy of safety, an all-absorbing concentration on this agency, and had the executive and managerial power to do it and was not so absorbed in the quasi-judicial role of these five guys who sit up there and allegedly decide licensing decisions and, in fact, are spending an enormous amount of time on export control decisions and not devoting themselves to resolution of generic safety issues, that you would do better. That is why we recommneded the change.

Senator Moynihan. Mr. Chairman, my time has expired. Could I just make a point what Mr. McPherson so well described, we are not talking about two different kinds of organizations one of which is better than another, we are talking about two different kinds of organizations. We are talking about, on the one end, you have the way Dr. Kemeny ran Dartmouth and, on the other, the way Mr. Haggerty ran Texas Instruments. And the problem is to match the correct mode to the objective.

Thank you.

Dr. Kemeny. May I add one word because one portion of your question was not answered. In addition to the extremely capable legal staff, we did also have distinguished outside consultants who helped arrive at this.

Senator Hart. Mr. Haggerty, briefly.

Mr. Haggerty. Let me just add to that I think it is important in examining the structure of the NRC you remember the difference in policy execution. The present policy mixes the two of them and insists on seeing the role as an adversary postion, and all that does is ensure the kind of confusion we have over there. Furthermore, it is written into the department heads, so-called executive director, is in charge of administration. You not only have five people on top, you have departments underneath that are not coordinated. The thing is legislated for confusion.

Senator Hart. Congressman Cheney, and I apologize to the minority side. I have tried to alternate Democrat and Republican.

Mr. Cheney. I thank the chairman.

I wonder, Dr. Kemeny, and I would direct the question to the commissioners at large, let's assume hypothetically for a minute that all of your recommendations were to be adopted by the Congress. The President and Congress would look at them and conclude they are indeed wise. Would you be willing then to comment as to whether or not you would feel comfortable having the Nation move forward with respect to nuclear power?

Dr. Kemeny. I think it would be best if each of us spoke to that individually.

If I could add one thing to what you say, in addition if the organizational and attitudinal changes occurred to the

industry side, which is equally important, I would personally feel comfortable. That is a personal opinion.

Mr. Cheney. I recognize the Commission didn't really vote. How would others feels?

Dr. Marks. I think I would feel comfortable about the fact we would have a viable nuclear option. But I would also feel in common with that there should be no relaxation in efforts to develop alternative safer forms of energy, because I think no matter how safe we make it, nuclear energy is a dangerous technology potentially. And the judgment that I am giving is one that I, personally, am willing to accept the risk under the circumstance you descirbe.

Mr. Cheney. Thank you.

Mr. Haggerty. I think I would answer pretty much the same as Dr. Marks has. I think the important thing is to preserve the option. I think the situation is an extraordinary one in the total energy situation in this country. It is unnecessary to decide the exact role that nuclear energy is going to play after the year 2000 and I think irresponsible to kill it at the present time. All of these other solutions that sound so good are only partial solutions, and what has to be preserved is the option, and I think that is the responsibility that bears on all of us, to preserve the option and decide at the time when all the alternative sources have had an opportunity to be evaluated on the same basis. I mean solar energy, for

example, I know something about that, too, and there is a lot of foolishness talk there. Only when we get there with the same kind of technology will we know what will be accomplished. I think the answer is I would feel comfortable if we executed what has been recommended because I think it would preserve the option with an adequate level of caution and examination so that overall policy decisions, which were certainly not for this Commission, can be made, weighing all of the considerations that are present.

Mr. Cheney. Dr. Lewis.

Dr. Lewis. I think everybody knows after all my earlier comments. I don't think I will ever be comfortable as long as there a nuclear power plants in operation because, as I said earlier, they cannot be made failsafe. Some people may be willing to take that one-in-a-million risk. I am not. I would like to see we eventually reach the point where we do not have any nuclear power plants operating. I am not so irresponsible to say we could afford to turn them off now. But you asked if I would be comfortable, and to be honest, I am not going to be comfortable as long as those things are out there with all that radioactive material inside of them.

Mr. McPherson. I would agree with Haggerty and Marks.

Mr. Taylor. I have a slightly complicated answer. Before TMI, I was reasonably comfortable with the reactor safety situation on the ground that I found it inconceivable that the

first accident would be a very bad one in which a lot of people would be killed, and that as long as we remained alert to signals that something needed to be fixed, whether it had to do with people or equipment, then I though we would respond accordingly and fix things before they sort of leaked or gave some indication they would leak before they burst. As a result of our investigation, I am much less confident about reactor safety on the ground that we have overwhelming evidence that neither the regulatory process or industry was being alert in reactors to, in some cases, very strong signals that things needed to be fixed. They weren't fixed.

Nevertheless, my concerns about nuclear power, in spite of this increased concern about safety that I just mentioned, are primarily centered on another aspect of nuclear power development, and that is its connection with the production of nuclear weapons and their use either by countries in acts of war or by noncountries, criminals, terrorists, blackmailers. I have been very discouraged by what we have turned up in the ability of the Nuclear Regulatory Commission to handle the safety issues. I have been separately concerned about the inadequacy of the safeguards against the diversion and theft of materials still today. They are much better than they were 10 years ago, but I think we still have strong indications that that problem is not solved either.

Mr. Cheney. None of these were really addressed by you.

Mr. Taylor. They were not addressed by the Commission. I am not a particularly well-disciplined person I guess, but I was proud of the fact during our deliberations I never brought these up for discussion by the Commission because they were not our business. I am bringing them up now because you asked a direct question about how each of us felt about nuclear power.

Mr. Cheney. In light of your six months of effort, perhaps you are entitled to have an opportunity today.

Mr. Taylor. I think now we are not deliberating about a recommendation or vote. I would also like to say that we do have an enormous opportunity, set of opportunities, in another direction, and that is the use of renewable forms of solar energy. I happen to be a maverick in these field. What you see when you look at the status of solar energy economics particularly depends on where you look. If you look at the present Federal program of the United States, and most of the programs by the advanced industrialized countries throughout the world, I would say it is not a terribly optimistic picture. If you look, however, at the reasons why the cost of solar energy are high, both on the commercial side, what is available now, if you look in the Yellow Pages for something to buy, or if you look at the overwhelming emphasis in the Department of Energy program on solar energy, you find that it is too expensive, but not for fundamental reasons. This is not the proper place, I believe, to go into

the reasons why we can, as I have over the last three years developed a conviction that with changes, solar energy does offer an immediate alternative -- and by "immediate" I mean certainly on the scale it takes for license and construction of a nuclear plant to become an operating plant. That is on the scale of 12 years.

Mr. Cheney. Thank you for your response.

Dr. Kemeny, did you have an opportunity to look at the risks associated with other technology for producing energy?

Dr. Kemeny. No, we did not. We specifically considered that, and given the enormous charge and given only six months, we would have botched that job.

Mr. Cheney. But it would be fair to say -- and I don't mean to criticize -- you did not evaluate the risk connected with producing coal, for example?

Dr. Kemeny. No, we did not.

Mr. Cheney. Secondly, I wonder did you have the opportunity, any members of the Commission, to look at facilities outside of Three Mile Island to see how other control rooms might be designed and operated at other utilities, or look at some of the training facilities now in existence in connection with training?

Dr. Kemeny. We concentrated on Three Mile Island, its utility and some of its suppliers. We did somewhat accidentally run across incidents in other areas, and some commissioners

looked at other plants, but not in a systematic way. I think our best view came through our investigation of the Nuclear Regulatory Commission. Of course, we looked at their overall charge. For example, the kind of incredible evidence that their operators, the TMI operators, ran well above average nationally on their examinations. That says something.

Mr. Cheney. One more question. Do you have any sense at this point, based on your experience, that the goals of nuclear safety that are sought by the members of this committee as well as your own Commission are in any way inconsistent with private ownership of nuclear power?

Dr. Kemeny. We have found no evidence that would indicate that.

Mr. Cheney. I thank you.

Senator Hart. Thank you, Congressman.

Congressman Markey.

Mr. Markey. Thank you, Mr. Chairman.

At the outset, I would like to add my concurrence with the feelings of Dr. Lewis and Dr. Taylor on the advisability of pursuing the other alternative energy sources in our country. On the whole matter of dialogue on that potential of fulfilling our energy needs for the remainder of this century, what I would like to do -- and I wish there were more members still here -- I would like to pose a question to you. It wasn't specifically voted upon by the Commission, but it is the question that

Senator Hart and Senator Kennedy posed to the Senate in July and one that I am the sponsor of that is now pending before the House, and that is the question of a construction permit moratorium that would last six months. That would give the Congress an opportunity to have an exhaustive series of hearings on the recommendation you have made for restructuring of the nuclear industry in this country and protection of people, to give us that chance to end business as usual, to reclaim that authority in the Congress we have abrogated to the Nuclear Regulatory Commission and industry for the last quarter century so we can, if we do send that industry forward again, we do so with being able to give some assurance to the American people that we, who are the final repository of that responsibility, have had that breathing spell, that we stepped back and did make that exhaustive analysis of nuclear power. I am not saying that six months is an adequate period of time to od it, nad indeed in that six-month period of time we might decide we might need an additional period of time.

But if you had to vote in Congress tomorrow as to whether or not we should, on the basis of recommendations that you make here to us today, that we should take a six-month breathing spell and say to the Nuclear Regulatory Commission not to shut down any existing nuclear power plants, but for new plants that have not yet been given construction permits we are not going to allow to go forward until they have decided that siting

standardized certain portions of nuclear power plants, and those related questions, that we want to reclaim that authority just for that brief perod of time, and you had to be a member of Congress and you could not abstain because your constituents would expect to have you vote, how would you vote tomorrow? Dr. Lewis.

Dr. Lewis. I obviously would vote yes. If I might make a suggestion to a member of Congress, I hope that every member of Congress will have a chance to read this report before that vote and hopefully it will persuade them that six months may not be enough. But if that is the best you can get, I certainly would vote that if I were a member of Congress.

Mr. Markey. Dr. Marks.

Dr. Marks. I would vote yes, too. But I don't think, with all due respect, that that is a very substantive move in terms of the thrust of all of our recommendations. You are not dealing with new operator licensing, you are not dealing with the existing plants, and I think that, with all due respect, I could not emphasize more that what goes through our findings and recommendations speaks to the ongoing operation of this industry, and I think that anything that would divert us from moving forward to take care of some of these problems, and as I say, about a third of them could be done promptly, it doesn't need a moratorium; or if you want to say get them done before a moratorum, that is fine. I would say anything that would divert us from that kind of thrust, I would vote

for it.

Mr. Markey. I would add it would not be my intention, because I would concur with you, we would have to go much further in any of the recommendations that Congress would have to make to the Nuclear Regulatory Commission, or a successor agency. But at the same time, if that was a consensus of what could get through Congress this year, you would vote for it.

Dr. Kemeny.

Dr. Kemeny. Could I answer that in two parts?

Mr. Markey. Yes.

Dr. Kemeny. Certain I did vote to give the President and Congress a chance to consider the recommendations. But I do want to underline what Dr. Marks said. We have absent all four members who did vote for the proposition. I think I should point that out.

Mr. Markey. Mr. McPherson.

Mr. McPherson. No, I wouldn't vote for it. I would vote for something that had a substantive hooker on it, and I offered one in our deliberations. In fact, I was called a few days before these votes by someone connected with the Union of Concerned Scientists, and I told him my dilemma. I recognize the strong merit or logic in the proposition that, having identified a whole lot of things that were wrong in the industry and regulation of it and so on, as Lyndon Johnson

used to say, therefore, what are you going to do about it? And that would suggest something should be done. But I couldn't fix for myself any event upon the happening of which one would feel comfortable in ending the moratorium. It was as if you were putting a bracket in a sentence and you knew where the beginning was but not what event eneded it. I invited him to make a suggestion. He made the same one I have been messing around with, and that is siting. I don't think of it necessarily as a moratorium, but it was so identified by other members of this Commission. The notion was that there would be no more construction licenses or limited work authorization permits that were in areas that would violate the siting recommendations. That would take a long time to develop those siting recommendations. I went on and said if a plant had a limited work authorization, work permit, in an area near a populated zone -- in other words, if it only had scraped the ground and dug a hole, the Commission ought to be authorized to revoke that permit and buy them out with your authorization and appropriation; take money and pay them off for what they had expended in good faith reliance on the limited work authorization permit they had gotten. And if they were already into the construction permit phase, that you ought to throw a whole bunch of heavy what they call racheting at them; you ought to make them meet higher standards before they get an operating license. That scheme went down the

drain.

I still have a problem with six months, not because you should say it is six months or two years, but simply I don't know what that means, whether it is six months out of the Nation and its energy problems coming to a head in the latter part of the eighties.

Mr. Markey. It is basically six months out of the life of the Nation, where an impartial, blue-ribbon panel says there is a body responsible for giving us recommendations to securing the safety of this industry, which they have been inadequate in doing, and instead of five commissioners we will have one; we will go back to the Atomic Energy Commission. I don't know whether five good members of a commission or one lousy member of a commission is better. I don't know which procedure is going to give us efficiency or sensitivity or education or reanalysis by this government. We are the final repository of that responsibility. That is what it would do. It would give us at least six months to have you people and your counterparts who share this responsibility to come before us again and let us know what we should do in the aftermath. Just that breathing spell. If you don't think that is an adequate period of time or a healthy proposition, I can accept that.

Mr. McPherson. It is just I don't see the logic frankly. I also would point out what Dr. Marks did, you are talking about

the construction permit, you are talking about something that is 10, 11, 12 years away from an operational plant. The more important thing to do, in my view, is to really reform the NRC and help the industry reform itself and require true sanctions that have to do with operating permits.

Mr. Markey. As you know, the problem is that we are being told now we can't shut down the existing power plants because it would be some form of detriment to the rate payer. The industry has already made that commitment and we don't want to shut them down, the people already constructing plants. I don't know how much of an invasion of their social contract we can really afford to interject at this point in time, and we are saying maybe for construction permits, maybe understanding as they get into the mill, into the pipeline, that it ought to be initial construction permits; maybe we want to stop that part of the process to build in assurance so we are not put in the position of saying, hey, we made a mistake, you have to pull it down, and having them say, you let us go forward, let us finish this one.

Mr. Taylor. I would vote yes and give two reasons why. The first is if we are talking of six months, I would be very surprised if any utility is going to apply for new construction permit in the next six months anyway.

Mr. Markey. We are talking about the ones already in the mill. There are 30 that have already applied.

Mr. Taylor. I see. Then let me say that the penalty of, let's say, a six-month period of holding up the actual issuance of such licenses that have been applied for, even if it applied to all 30, which it does not, I find is well worth my second reason for voting for such a proposition, and that is I think it is in the nature of things today that a strong signal has to be sent out that this particular set of findings about the nature of the regulatory and the industrial process having to do with nuclear power is not satisfactory. And I still have faith in the political process. I think that if after six months individual members of Congress, in searching their own consciousnesses and their responsibility to their constituents, believe questions have not yet been resolved, then I have faith -- I can only call it that -- that the Congress would then continue with a high sense of urgency to examine the question of whether this country should then proceed with issuing new construction permits.

Mr. Markey. If I may add, I agree with you, I think we have to send forth that signal to the American people. It is time to call a halt to business as usual. I think the difficulty is that you say this is a de facto call for a moratorium. Mr. McPherson says it is a matter of semantics. It is a political Rorschach, you can see what you want to see. What we are addressing is the seriouness with which you take your recommendations, how much you attention you want this body

that is representative of the American people to pay to it in the period of time we have to focus on it in the aftermath of the recommendation.

Thank you, Mr. Chairman.

Senator Hart. Thank you, Congressman.

Dr. Kemeny, I would like to ask you about the seriousness of this accident. How close did this reactor come to melting down, in your judgment?

Dr. Kemeny. We made our very best attempt to explore that, and I strongly urge you to very carefully read the written report starting on the bottom of page 13 of the overview. We looked at it from the point that so many things went wrong through the accident, what if one more thing had gone wrong? We explored a number of alternatives, some of which would have made it better or worse, and one, leaving off the high pressure injection system working, could have resulted in a significant amount of meltdown, sufficient that we weren't sure a meltdown wouldn't have occurred.

Our staff went there and explored if there has been a melting through the bottom of the reactor vessel. Here is where I have very carefully to state qualification of what I am about to say. I think the finding is important, but it has a large number of qualifications which I urge you to read very carefully. Under the circumstances of this accident, and this particular plant, even if it had melted through, it would not

have resulted in huge amounts of radiation getting out of the containment. Therefore, there still were additional safeguards in the equipment and building in this particular case. For example, this building is built on hard rock, which is a very important part of this finding. Please don't read that as saying there cannot be a meltdown that has results that are catastrophic under any circumstances. It does not say that. We are saying in this particular case we may have come close to total meltdown with cleanup operation of horrendous proportion, but there were still some safeguards left.

Senator Hart. Mr. Taylor, what is your response to that question?

Mr. Taylor. I would like to say a little bit more because I agree with the chairman's assessment of the result of our work. I think one needs to distinguish carefully between two things. First, how close did we come to a meltdown? By a meltdown, I mean sufficient melting of fuel and core so as to proceed to work its way through the pressure vessel and on down to the concrete on the sump beneath and melt through, if you will. I think we came very close to that. The calculations that were done to determine what the temperature in the fuel would have been and how close to the melting temperature of the fuel were exploring a new technical field in the sense that they were using calculational techniques that have been recently developed. We used a computer code of zones. That

computer code is not capable of paying any attention to a situation in which there had been sufficient damage to the core to allow the fuel pellets -- these little objects about an inch long and half an inch in diameter -- to fall some distance, most of them not very far, but have high density of core and form what is sometimes called a slumped collection of fuel pellets. That is important because in a situation like that, one can certainly visualize a situation where cooling by steam from the water below doesn't take place significantly. Under those conditions, one can then do a calculation which is very simple: how much heat is being released per second by the fuel and how much heat has been released in the act of accounting for the hydrogen that formed in the bubble and contributed to this burn or explosion, or whatever you want to call it, in containment? To account for that hydrogen, you have to assume that something like half -- there is some uncertainty -- of the zirconium reacted with water. That releases energy. If you also put that energy into the fuel, in addition to the decay heat, in a situation not being cooled, you find that the time to reach the melting down of the uranium oxide after uncovery of a particular part of the core is less than the time we know it was uncovered; therefore, we know if there are places in the core that were not significantly cooled. We don't know to what extent that happened. We won't know until we get in there and see the fuel

itself. We could have seen a substantial, significant, let's say percent at least, we could have actually had in the accident a situation where significant amounts of fuel actually melted. I am not saying that it did. I am saying that we can't prove that it didn't. Let's put it that way.

If you then further assume that there are places in the core that were not being adequately cooled and as how long would it have taken for a majority of the fuel to reach the melting point of uranium oxide, if there had been delay in turning emergency core cooling back on, how long would that take, it is about 15 minutes. I am not suggesting we have done an analysis if the operators delayed 15 minutes, we would have had a meltdown. So I am saying I think there is a way of saying we came close to meltdown.

When it then comes to asking what would that do in terms of releasing radioactive material, there is a popular tendency to equate a core meltdown with a massive release of radiation. I think in our explorations of this, which are subject to lots of caveats, we tried very hard, and I can assure both committees that we tried very hard to find a route of some kind following a meltdown to a large release and were not successful in doing that. I will say that this finding depended on an assumption that there were no further operator mistakes purposefully -- it is not purposeful or purposeful -- following the meltdown. Now we know that if you put on a computer what

would happen at TMI if you ignore the operators, we wouldn't be sitting here. Following a core meltdown, there could -- we didn't analyze any of these -- manageable mistakes by operators, and whether anyone would be stupid enough to open the valves from the sump and let everything out and activate the sump pump and violate the containment process, and then do things which I would say were just as inappropriate during the process of dealing with the accident before substantial melting happened, that there would have been, under those circumstances of an assumed set of operators' inappropriate actions, a very bad accident. In my view, this is not incompatible with what Dr. Kemeny just said. I am trying to go a bit further in exhibiting the state of uncertainty in that finding.

Senator Hart. I understand. What were the critical 15 minutes?

Mr. Taylor. From about 215 minutes after the start of the accident, which was the time at which the high pressure injection system was turned back on. If that had not happened for another 15 minutes and there were regions of the core not being cooled by steam or water, then those regions of the core, I think without question, would have melted.

Dr. Kemeny. Could I say the only question is that is how long. I think we are in agreement if the water had been left off for a sufficiently long time, certainly there would be

enormous meltdown.

Mr. Taylor. Two hours and one hour is longer than 15 minutes.

Dr. Kemeny. The only reason I stepped in is not to disagree with Dr. Taylor, but to say if there is any question, it is how much longer it had to happen.

Mr. Taylor. I want to make a further statement about this. If you look at the analyses in the staff report on the subject, the calculations that are presented are ones in which this blocking of fuel cooling capacity are not taken into account. The answer there, I believe, to rely formally on the computer printout, to reach 5200 degress, which is the melting point of uranium oxide, was 50 minutes. And I am saying that there are questions about the applicability of that computer program.

Senator Hart. Congressman Symms.

Mr. Symms. Dr. Kemeny, it was my understanding -- and you correct me if I am wrong -- that the Commission did face the issue of what should be done in the interim period with plants that are currently operating, and the Commission decided that these plants operate.

Dr. Kemeny. The only recommendation that speaks to that subject is number eight under the Nuclear Regulatory Commission, that urging in any licensing action that should take place certain conditions should bet met, most importantly taking in

new safety regulations.

Mr. Symms. Did you confront that issue then of what should be done in the interim period with plants now operating?

Dr. Kemeny. Only indirectly. We recommend the starting immediately of a process by which plants would be periodically reviewed in-depth to see whether they are performing satisfactorily under their current license.

Mr. Symms. I noticed, and I agree with your recommendation and I quote from what it says "responsibility and accountability for safe power plant operation, including the management of a plant during an accident, should be placed on the licensee in all circumstances." That is on page 63.5 And I assume from that statement that you would not support a proposal which would transfer control of a plant in a crisis from the utility to NRC or its successor?

Dr. Kemeny. No, sir. We can out it is up to the utility to do that, because it is most unlikely someone coming from outside would know that plant sufficiently well to bring it under control. If I may add one point. One of the fundamental reasons for requiring higher standards of the licensee, we felt if the utility is not capable of managing an accident, they shouldn't be running a plant in the first place.

Mr. Symms. Dr. Kemeny, am I correct in saying deficient instrumentation to measure radioactivity released as a result of the accident did not affect the Commission staff's ability

to estimate the radiation doses to health effects resulting from the accident, and do I also understand radiation released as a result of the accident will have negligible effects on the physical health of people living in the area?

Dr. Kemeny. That is correct.

Mr. Symms. I would like to ask you one other question.

Mr. Kostmayer. Would the gentleman yield?

Mr. Symms. Yes.

Mr. Kostmayer. Did you indicate though that the study to determine whether or not those levels were harmful or not, as conducted by the NRC, were not adequate?

Dr. Kemeny. I think Dr. Marks tried to speak to that. We had hired our own consultants who were the ablest people in the world. Although the data is incomplete, they feel they can determine within a factor of two how much radiation was released.

Mr. Kostmayer. But the data of your own consultants is incomplete and the studies of the Nuclear Regulatory Commission on the score are not adequate generally. Do you concur with that or am I mistaken?

Dr. Marks. Technically, you are correct. But our consultants felt they had enough data to be very comfortable about the conclusions they reached.

Mr. Kostmayer. I thank the gentleman for yielding.

Mr. Symms. Thank you. I appreciate the genlteman's

contribution.

I want to ask you further in this whole area, if I noticed correctly in the report, it said the only real major health hazard was the trauma of the concern of people over what might happen if the worst thing were to happen. I know in these supplemental views, one of your commissioners who is not here mentioned the fact that I think she was quite critical of the handling of the general reporting of it. There was too much reporting of what might happen, not what was happening to the American people. After having worked on this Commission and having reviewed it, Dr. Kemeny, how do you feel overall about the general responsibility with respect to the news media in overdramatizing the incident or in not overdramatizing it? What was your consensus on that, if any?

De. Kemeny. I think since that task force was chaired by Dr. Lewis, I will ask her to respond.

Dr. Lewis. We did a content analysis of media coverage of Three Mile Island and found that, contrary to the charges against the media, there was not sensationalism, with one or two minor exceptions. Where there was confusion, it was traced back to the sources. In fact, the NRC itself was confused. The NRC in Washington was giving out alarming information to the press, and the press was merely reporting it.

Mr. Symms. Dr. Lewis, where do you live?

Dr. Lewis. In New York.

Mr. Symms. And where does the commissioner who wrote these views live?

Dr. Lewis. In Middletown.

Mr. Symms. She lives right at Three Mile Island

Dr. Lewis. She was giving her personal view, and I highly respect it.

Mr. Kostmayer. Would the gentleman yield again?

Mr. Symms. I don't have much time.

Mr. Kostmayer. Dr. Lewis, what is your profession?

Dr. Lewis. I am a former Washington reporter. I am now associate professor of journalism at Columbia.

Mr. Kostmayer. I think the gentlman for yielding.

Mr. Symms. What I am getting at, there was a great todo on the national media about the fact that there might be some kind of explosion that might endanger the lives of 200,000 people, then it was all settled down to confusion. I agree with the report, due to the confusion on the part of the NRC and other experts that were in the area that weren't quite sure it could be safe. But don't you believe that there was some example of overstating what was happening there and creating more trauma than necessary?

Dr. Lewis. Well, the evidence that we collected, imperfect as it was, indicated it was not so. In fact, we found through the content analysis the media gave more reassuring statements than alarming statements in terms of Three

Mile Island. No doubt the overall impact of suddenly living in a town like Middletown and having the media reporting basically alarming things is going to frighten people. There is no doubt about it. Suddently to be confronted with the facts of Three Mile Island, it was frightening. But if you look at what the press did in the scientific way that we did, that the reporting was not more alarming than was justified by the information that it was given.

Dr. Kemeny. Could I add one word to that. I think that the study that Professor Lewis quotes was an extremely thoroughly and professional job. There are some things that I believe have not been picked up in the news media. This is, of course, Commissioner Trunk who lives in the area. If I may recite a very small anecdote, it may show what we are saying. My hometown newspaper carried a portion of the Times article. I read very carefully the artilce in the New York Times on the study on low level radiation conducted by the National Academy. It was a story where you had to read to near the end to get the full picture of it. It appeared in our hometown newspaper, but only the first third of it was quoted under a banner headline -- which is very rare --"2000 Nuclear Deaths Predicted." That particular kind of incident didn't say anything wrong, but since it only printed a third of the article you never found out that was over a period of 25 years for all states in the United States that would have shown up.

Mr. Symms. I thank you very much. I think it is a very good point.

Just one more question. What, in your opinion, if you could sum it up, were the conclusions in the report on the viability of nuclear technology to provide part of the answer for keeping America from being dependent on foreign sources of energy? Is the technology still a viable technology, after looking into the report, or not a viable technology?

Dr. Kemeny. I think, as several of us spoke, that if the kind of recommendations that we have said are implemented both with respect to regulation and industry, that we would feel that it is an option. I think, as many of us have said, we hope the United States will explore all options.

Mr. Symms. Do you think there is any way when that is all over, because I am sure this Congress will respond and I am sure that the industry will respond and the American people will response, as they always have when confronted with a necessity, that this incident at Three Mile Island may in some way make nuclear power safer in the long run rather than going on as it was, and some day down the road nuclear power will be much safer than it has been up to this point?

Dr. Kemeny. I think the one thing we are all agreed on, if the right lessons are learned from this particular accident, that it would lead to a significant increase in the safety of it, that if the right lessons are learned -- and that is why

we titled our report "The Need for Change" -- if that legacy is that the changes necessary are made, there will be a significant contribution to make the technology safet.

Mr. Symms. Thank you.

Mr. Bingham (presiding). Mr. Kostmayer.

Mr. Kostmayer. Dr. Kemeny, the editor in today's Times said the Commission's report is an indictment. Do you concur with that characterization?

Dr. Kemeny. Yes, I do.

Mr. Kostmayer. Can you tell me if at any time you think that Met Ed misled or deceived, either deliberately or not, putting aside the technology for the moment, but the constant news conferences that the public relations fellow had up there, was there a deliberate misleading or deceiving of the poeple in by this Met Ed?

Dr. Kemeny. Our report says they were certainly very slow in sharing bad news with the world. We have some partial evidence in our report. I know your committees are doing a much more thorough job. We felt there was such a total degree of confusion there, we did not concentrate on the question of whether people were deceiving or just didn't know what the heck was going on.

Mr. Kostmayer. Do you didn't really address the question as to whether it was deliberate or not?

Dr. Kemeny. No. We were more concerned about the degree

of confusion in what is being done about managing the accident.

Mr. Kostmayer. I am concerned about what appears to be a contradiction. "Our findings do not, standing alone, require the conclusion that nuclear power is inherently too dangerous to permit it to be continued and expanded as a form of power generation." Quoting still, "Neither do they suggest that the Nation should move forward aggressively to develop additional nuclear power." I am not exactly surewhat we should do.

Dr. Kemeny. We do mean precisely that.

Mr. Kostmayer. You seem to be saying two contrary things at once.

Dr. Kemeny. Our report says neither of those.

Mr. McPherson. What we were attempting to say, Congressman Kostmayer, only makes sense if you go on to the next sentence that says they simply state our findings. "If the country wishes, for larger reasons, to confront the risks that are inherently associated with nuclear power, fundamental changes are necessary if those risks are to be kept within tolerable limits." That is a highly compacted paragraph.

Mr. Kostmayer. You are saying fundamental changes are necessary before we make that decision?

Mr. McPherson. I am saying that you folks have to make a decision up here.

Mr. Kostmayer. But if we do?

Mr. McPherson. Knowing that nuclear power has risks in any event, if you decide nevertheless that for larger reasons, obviously economic and foreign policy reasons, energy supply reasons, if you decide that we ought to go ahead with nuclear power to the extent that it is presently planned to, then to make that a tolerable decision, to keep those risks within tolerable limits, there have to be these changes.

Mr. Kostmayer. Is that the same, Mr. McPherson, as saying we should not proceed until these fundamental changes, namely your recommendations, have been implemented?

Mr. McPherson. That would mean I guess --

Mr. Kostmayer. Because we are proceeding.

Mr. McPherson. Until all these changes are put into effect.

Mr. Kostmayer. No, I don't think so. We are, in fact, proceeding. I recognize that the practical fact is there aren't going to be any plants constructed at least in the immediate future. Btu we are actually proceeding. Nothing has changed since Three Mile Island. There is no government prohibition on the construction of plants. We are proceeding. Yet you have recommended funamental changes. There seems to be a gap in the report between the severity of the repot -- and Dr. Kemeny characterized it as did the Times article -- there seems to be a gap between the severity of the report and how far you are willing to go to correct that severity to do

something about it. You have said all these things and they seem to me to be a very damning indictment of the agency, of the industry, and of us in Congress, of the government's response. Yet you are proceeding just as we have always. You are not changing anything.

Dr. Kemeny. May I speak to that, please, because I think you have to realize what we did not do. We did not examine the alternatives. It has been said some times today that this risk has risk associated with it, and we all agree with that. But you have to look at the risks of alternatives. I don't believe there is a failsafe technology to provide energy for the United States. I think it would have been irresponsibl of our Commission to take a position on that without taking a look at the alternatives to decide if it is more risky or significantly less risky.

Mr. Kostmayer. What the alternative is to not simply shut down the 13 percent of the electric power we currently generate through nuclear plants.

Dr. Kemeny. May I say something on that, then I will yield.

Mr. Kostmayer. You are not recommending any changes.

Dr. Kemeny. That means a shift to an alternative, and if through the political process you determine there is a safer more desirable alternative, so be it. We did not examin that question, and therefore were in no position to say that

would lead to an alternative that is safer.

Dr. Marks. I am having trouble with your question.

Mr. Kostmayer. I am having trouble with your answer.

Dr. Marks. I hope we come out understanding each other better. We have 72 operating plants out there now. This report says that they are not being operated to a level of safety that we think is acceptable and attainable if the plant that we visited is typical of the industy as a whole.

Mr. Kostmayer. We don't know that.

Dr. Marks. We don't know. Our findings do not permit us to extrapolate beyond a caveat.

Mr. Kostmayer. But if we have to make a practical assumption that these are bad or good, shouldn't we err on the side of safety and say things today are bad?

Dr. Marks. I, personally, think so. For you to think we are recommending full steam ahead is what I don't understand, because we are saying quite the opposite -- get on the stick. I mean one of the things I appreciate about this hearing today is because you couldn't have been more responsive, in my opinion as a citizen and member of the Commission. I deeply appreciate it. Somehow or other the NRC has to be told the same thing. I don't feel they are getting the message yet. Much of the message we are delivering here, many of the recommendations, they don't need a legislative mandate or Executive Order. They need to read or try to do it. We don't

have the power to try, I don't know if the Congress has the power to make them do it. They can do it if enough pressure is brought to bear. They can start them today. There is no reason today in this country there should be anyone in the operating room who has not passed all parts of the exam. The NRC does not require that today. An operator can flunk the part of the exam dealing with emergency equipment and still pass the whole exam and be in the control room. We don't think that is a good thing. We think somebody should do something about it.

Mr. Kostmayer. I would say I think you did have the power. I think you did have enormous power. The whole country was looking at this responsible, objective, bipartisan Commission. And I think it is extraordinary that the number of members did vote for a moratorium that did.

Mr. Symms. Would the gentleman yield?

Mr. Kostmayer. Yes.

Mr. Symms. Dr. Marks, have you had the opportunity to look at the NRC's report on the lessons learned from Three Mile Island?

Dr. Marks. We did.

Mr. Symms. What is your opinion of that? Do you think they learned anything?

Dr. Marks. We think there is some evidence they learned something, but not enough. And I will say, first of all, I was

one of those who supported the moratorium, so all my remarks are in that context. What I am trying to say, I do think we have given you a very strong report. If it fell short of yoru personal expectations, I understand it and respect it.

Mr. Kostmayer. I am just confused on the condemnation of the standards that exist, yet the reluctance to come out and say we ought to consider shutting them down completely. I understand the practical effects. You have acknowledged if the other 72 existing plants are comparable to the Three Mile Island plant, there is a good chance they are unsafe and people living in the areas surrounding them may be subject to considerable danger. Having said that, having delivered an indictment, what is the result of that?

Dr. Marks. The only thing I can say -- and I am sorry the other commissioners are not here to speak for themselves, but I respect their feeling that the mandate was so narrow that it was interpreted -- and we might have been in error -- but that is the way it was interpreted and consonant with our adivce to us, and they didn't feel they could go beyond where we come out. On the other hand, there is the unanimous feeling of this Commission's strong report, with moratorium or no moratorium, you can go forward with a great deal here.

Mr. Kostmayer. It is a good report and strong report.

Dr. Marks. I understand what you are saying and respect that.

Mr. Kostmayer. I appreciate that. I have exceeded my time. I would only say I think at the final moment you shunted the obvious conclusion.

Dr. Marks. I respect that judgment.

Mr. McPherson. May we always slip from that final essentially simplistic action if it is not logical to take. I think it was described as largely symbolic of a six-month of two-year moratorium or until enough of you all have had an adequate opportunity to look at it.

Mr. Kostmayer. It seems to be eminently logical. It seems so logical to proceed. In other words, you did all this, you said all this, you delivered a damning indictment.

Mr. McPherson. It is locial to take a largely symbolic action, which is saying as far as construction permits on something 10 or 12 years from operation, we will have a moratorium.

Senator Hart. Gentlemen, in the interest of time.

Mr. Kostmayer. Thank you, Mr. Chairman.

Senator Hart. I would strong urge since we are in a little bit of a trial between whether the Commission or the committee will last longer that we limit ourselves to two or three minutes.

Myself, I will ask only one final question. As you know, there is a current area of controversy which I don't believe your report addressed whether the possibility of a core melt accident or a so-called Class IX accident should be considered

in the licensing process. Do you or any of the other commissioners have a believe on that?

Dr. Kemeny. Yes. I believe at least indirectly that is implied in view of the fact the NRC has viewed this as a Class IX accident, which was defined as an accident that can't happen, something has to happen to the definition of Class IX accident. We do have a very strong recommendation saying that a much larger variety of accidents should be explored as a part of licensing emergency preparedness.

Senator Hart. Congressman Bingham.

Mr. Bingham. Thank you, Mr. Chairman. I just have two questions.

If I could call your attention to the wording or recommendation eight, which you have said, Chairman Kemeny, is the key recommendation, is it your intention in that recommendation that all three conditions -- A, B, and C -- should be satisfied before a construction permit is issued?

Dr. Kemeny. Yes, that is my understanding, sir.

Mr. Bingham. Is there any difference of opinion on that? That is quite significant I think, because number (b) applies to operating competence.

Dr. Kemeny. I am sorry, may I modify my answer in view of your pointing that out. Presumably the ability of the operator training would be more appropriate to the operating license than construction permit. Certainly the competence of

the licensee and its management capability would apply.

Mr. Bingham. That is something that should be explored before a construction permit is issued.

Dr. Kemeny. Yes.

Mr. Taylor. Mr. Chairman, I am not sure if I heard you correctly. I would like to point out the last phrase of the recommendation says before issuing a new construction permit or operating license; it has included both.

Mr. Bingham. Yes, that is significant, too, but my my question is must A, B and C be found before the construction permit issues, and Dr. Kemeny says yes.

Dr. Kemeny. I believe I answered that correctly. I am not sure how you would do operator training in the construction permit stage. What it does say is if a firm that has already gotten into construction now comes to the operating license stage, all of these should be checked.

Mr. Bingham. I am now somewhat confused as to your answer, because I think that the competence of the applicant to operate safely is something that should be examined before the construction permit is issued.

Dr. Kemeny. I agree. All I said is the one phrase in there about the operator training program, it is unlikely they would have one in place about that time.

Mr. Bingham. The other question, and I know you said you didn't examine nonproliferation or problems, but did you

consider in your recommendations for the change in the structure of the NRC the fact that it has to deal with export licensing, nonproliferation problems, or as I have been informally advised, it was the conclusion of the Commission that the NRC shouldn't have anything to do with the problems of export licensing?

Dr. Kemeny. I can tell you precisely what happened on that. We have a recommendation in here now that in the restructuring Congress should take a careful at what the NRC could be relieved of so they could concentrate on the safety of nuclear power plants. In an earlier version of it, which leaked, we tried listing examples, and we decided in the final version we did not have the competence to determine which were the appropriate things to remove. Therefore, it is not included.

Mr. Bingham. Thank you.

Senator Hart. Senator Simpson.

Senator Simpson. Thank you, Mr. Chairman. Mr. Chairman, I will have some other questions I will subject in writing and appreciate those being accepted in the record, and then just ask one or two more.

First, just a comment, again my appreciation and my thanks for the way in which you shared your thoughts in a most authentic way. It has helped me. It has firmed my opinion about your capabilities and your deep desire not to go out of

the mission that you were assigned. That must have been a tough one, and I think you achieved it. The issues of symbolism are rich in this area, and I want to commend you particularly, Harry McPherson, and I understand your remarks at the White House the other day. Your summary there was a highly capable presentation of the entire thing in a manner not to confuse the technology with the use of Engligh.

One more question. Your report seems to recommend a review to identify and remove all unnecessary burdens from the NRC that are not germane to safety. I was interested in that part of the comment. In view of any of those, are there statutory responsibilities that are assigned to the NRC which ought to be removed, and what are the most flagrant ones that should be removed because they are not germane to safety? What were the most flagrant ones that are just baggage?

Dr. Kemeny. I would be happy to comment on that with the preface that in the end the Commission decided we are not competent to recommend any specific item be removed. But we found that the commissioners were spending an enormous amount of time on things like export licensing. We know there is that difficult but important activity that must lie somewhere. It was not clear to us it had to be the commissioners of the NRC. We wished they would spend a lot more time on the safety questions. Again, as I say, we left the language as is because in the last analysis we felt we did not have the competenence

to make a decision.

Mr. Taylor. Mr. Chairman, there was discussion about the time the commissioners spent on export licenses and some discussion about whether to suggest that that be removed from the responsibility of the NRC. I spoke up several times about that. I certainly would have strongly objected to the suggestion that the attention that should be given to export licenses in the nonproliferation context was less important than safety. I happen to think it is more important. That is not to say this agency restructure to look at safety necessarily should not have that responsibility. I must say I am very grateful for the fact that export licenses have been reviewed by the NRC. I understand that this has removed attention perhaps from other issues, but someone in the government decides the direct line of the process of implementing foreign policy. I think it is extremely important.

Senator Simpson. I have heard the comments about the export licensing, and I concur there. But I am thinking of the other areas. Time is limited. But I was fascinated at the report when it listed as a nonsafety item the relief valve and one of the condensers at the root of the problem. I think we are going to have to deal with that statutorily through regulation.

Senator Hart. Congressman Symms.

Mr. Symms. Thank you, Mr. Chairman. I will be brief. I only would like to say I would hope -- and I appreciate all of you that have been here -- I would hope we might get the opportunity to get the remaining part of your commissioners up here some day so we may continue to discuss this with them. I appreciate the fact that the Commission actually did go up to that point, but did not make a recommendation for a moratorium. I think that is something that will have to be wrestled with in the Congress.

I think when one reviews the overall question of alternative sources of energy, the number of people killed when you use coal as a source is important in comparison to nuclear. There are other factors that have to be considered. You should be commended you didn't actually make that recommendation.

I may have a few more questions that we would like to submit so that we could get some answers back for our record, Mr. Chairman, and then I will yield back my time.

Senator Hart. Thank you, Congressman.

Congressman Cheney.

Mr. Cheney. Mr. Chairman, without asking any questions, thank you for being kind enough to join in this event. I want to once again thank the members of the Commission for the work they have done. I know it has been a difficult task. Clearly, you are wrestling with the same kind of emotions about the

subject that all of us feel.

Senator Hart. Thank you.

Senator Moynihan.

Senator Moynihan. Mr. Chairman, this is late to put this question, and I won't ask for an answer now, but rather to ask if it would be intolerable if the Commission might put something in writing to this general point, which is the key recommendation of yours about whether nuclear power is inherently too dangerous, and then your statement fundamental changes are necessary if those risks are to be kept within tolerable limits. You assume there are risks, and can they be kept within tolerable limits. Would it be possible to ask you to write us something about how you conceive of your concept of tolerable limits? I am sure you know this is an extremely difficult question for the political system to deal with. We encounter them now in the health area. Fifty years ago influenza removed most of the decisions we had to make in government today -- how much money will you pay to keep someboyd alive? And there is always a cost. You don't do something else. How much more pathology would you take for this form of energy as against another? Is this uniquely dangerous such as you run the risk as against the grim events of coal mining? Would you accept coal mining as tolerable limits, as it were? Am I making myself clear? I see that Mr. McPherson is nodding.

Mr. McPherson. Always willing to respond to you. I came out of this with a personal reflection both more nervous about nuclear energy and less. More nervous about the likelihood of an accident as serious as TMI happening. The Washington 1400, the Rasmussen report use figures that I can't embrace, so many exponential powers of the chances of a major disastrous accident. This was s small break LOCA, a little bitty thing, they thought they had bounded, with large consequences of a large break LOCA. Given all the possibilities for messing up, operators do in the face of some rather compelling conditiens hit the wrong button and kept the water off for too long so you have core uncovery. That chance seems higher than it seemd it was when I started on the Commission. I just assumed they ran them better than that.

On the other hand, the result of the study by the team that we asked to look at the what ifs, all the list of things, the one other variable, including leaving the water off for another couple hours than it was, shows no break of containment. So it makes me feel more comfortable, even with all human error or breakdown you don't break a breaking or Jane Fonda Syndrome occurring. Nevertheless, there are lots of other ways, as our report says, that we didn't cover, lots of ways in which there could have been releases of major amounts of radiation from the containment. So it doesn't leave you terribly comfortable. Even though you are flawed, the initial

reliance that goes back to the AEC days on building five-foot think reinforced concrete walls has some value. They hold. Going to a 30 pound per square inch pressure spike, you don't come anywhere near busting open the building.

What is tolerable? Obviously we did not do risk analysis. We didn't try. It will be you and the President who have to take a whole list into consideration, whether these particular risks are high enough given the economic and foreign policy considerations in the world which also affect it, which are considerable.

Senator Moynihan. This is, I guess, my point. I don't want to pursue it too much, Mr. Chairman, but if you could hear me onthis. Is it possible to make estimates, if we were to cut the energy consumption in the country by half, you would raise the mortality rate by some unappreciable amount? A member of the Canadian Atomic Energy Commission estimated the risk associated with various forms of energy and came up with solar power as the most costly in health terms because of the new of people that correspondingly fell off ladders. I think it would help us if we were to know, since we have to make relative decisions, well, we know the system is six people per thousand, and you are prepared to have six people die per year. We will get congressmen prepared not to have six people die per year. That is the difficulty of even raising these questions, but I think we need to know from you are you talking

about a range that would be associated with most other forms of energy and say this comes within that range or risks of catastrophe have a sort beyond anything associated with the now compartmentalized risks of energy?

Dr. Kemeny. Senator, could I answer that in two parts. First of all, we did look at the Canadian study and also various criticisms of it, and we decided there is no way we could do a decent assessment. Let me say we, of course, very strongly urge you to carry out that kind of estimate to make sure that people are doing it, because I think it is terribly important for the energy future of the United States to know the relative risks of sources of energy.

I think our statement is really a much more modest one; that is, we found certain faults that we feel are sort of underlined there, and there is a constant danger. We also feel these are things that are correctable. I think we have come up with eight sets of recipes, but they are correctable errors that very significantly increased the risk of this particular technology, and what we addressed is how to correct that.

Dr. Marks. May I comment. I think you have asked the critical question, in my opinion, and one to which you will, I think, not be able to get a quantitative answer even of the sort you suggest. But I certainly would like to be able to respond to you in writing if I may, because we have done a

great deal of thinking about this issue, and you will get some qualatative parameters within which to make your judgments. And it is a very difficult call.

Mr. Taylor. I would like to say I would like to respond to Senator Moynihan's question, and the general nature of the answer is going to be that your question is unanswerable, and, therefore, there are certain things that need to be done in setting energy policy in the light of the impossibility of answering that question to everyone's satisfaction.

Senator Moynihan. That is a very important fact.

Thank you, Mr. Chairman.

Senator Hart. Thank you, Senator.

Congressman Weaver.

Mr. Weaver. I want to thank the chairman for holding this hearing, because we have developed here something that the newspapers this morning missed, as a matter of fact, the biggest story has become very clear in this hearing, and that is that you have asked for a moratorium on the operating licenses of nuclear power plants. You said no operating licenses will be issued, in your recommendations, unless these three criteria are met, and they are tough critieria. So this indictment, which is your word, is, in effect, a moratorium, and I think the newspapers missed it. It is actually a much more tough one than Congressman Markey is going to propose in the House because this could go on for a number of years meeting

this criteria. Did anyone in the White House ask you or suggest to you not to use the word "moratorium," because you have?

Dr. Kemeny. No, sir. As a matter of fact, may I say for the record, during the entire period of the investigation, from when we were first appointed, at no point did either the President or any member of the White House try to influence on anything that should or should not be there.

I wish to say on that particular one, I think it is, within the Commission, a semantic problem as to what people have their own feeling about.

Mr. Weaver. I see that.

Dr. Kemeny. It was a difference between a moratorium that is across-the-board versus what you are describing as a moratorium, which is a case-by-case basis, which has a different effect on which we all agree.

Mr. Weaver. On a technial matter, Dr. Kemeny, did you go into the background of the operators of Three Mile Island? The one thing in my investigation about this was a very interesting thing; most of them had the same training.

Dr. Kemeny. From the U. S. Navy.

Mr. Weaver. In other words, they were highly trained.

Dr. Kemeny. Sir, could I say something on that. We did have, some of us, a conversation with Admiral Rickover, who is a fascinating person. I will tell you something very

interesting, and we have checked this. A company cannot get the record of an individual in the U. S. Navy without a release of the employee, and this company does not require such a release. We were alerted to that by Admiral Rickover, and, therefore, I know that the Navy program is a superb training program, from all I have heard about it. And I am sure there are superb people there. Don't misunderstand me. I am just saying if you have not looked at the complete record of an individual, how do you know that was a superb product of the U. S. Navy or somebody who has flunked out? I claim they just do not know.

Mr. Weaver. Mr. Chairman, I have one final question, and that is in my estimate more significant. It was something that came out in my investigation at Three Mile Island, that came out almost by accident in questioning various people, the NRC and engineering firm. I was curious to know if you developed the same thing, because it was almost an accident. What would happen to a nuclear plant such as Three Mile Island if there were a power failure, if they lost their electricity?

Dr. Kemeny. I believe I am going to have to ask staff to respond.

Mr. Weaver. I know Mr. Taylor knows.

Dr. Kemeny. I believe that is one of the things they are required to check out during the licensing process.

Mr. Weaver. Check out? We do have power failures in this

country; they have occurred.

Dr. Kemeny. Certainly.

Mr. Weaver. I am saying what would happen if you had a power failure at a nuclear plant in the electricity coming in, what would happen if that failed and the generator failed, the standby generator failed or were sabotaged?

Mr. Taylro. That is two different things.

Mr. Weaver. A power failure is a power failure. One comes from outside the plant into it, from the utility system; the other is the standby diesels in the plant. A power failure comprises both. That is one question, what happens if you have a power failure?

Dr. Kemeny. You are getting into things I learned in the last six months.

Mr. Weaver. It is the same with me.

Dr. Kemeny. It seems to me several things. For example, the control rods, if they lost their power, drop in.

Mr. Weaver. The answer -- and I have checked this out with every single top NRC person -- a core meltdown occurs, irreversible, absolutely and completely.

Mr. Taylor. I think that is correct as long as you assume that no electric power from any source is available to activate the pumps, the various emergency control equipment, it is correct. I think it is very important --

Mr. Weaver. It is extremely important. I figure it would

take about eight minutes to disrupt the power.

Mr. Taylor. I was going to say one aspect of that, that Dr. Kemeny referred to, if there is a total power failure, the design of the control rod mechanisms are such that those drop down.

Mr. Weaver. You have still 250 megawatts of power. It is enough to get that uranium oxide up to 5200 degrees. But that was the most astounding fact I discovered. I was asking one of the top people in the NRC this question. I said what would happen. He said, "We would put on the steam system." I said, "That would have failed because you have no power." He said, "My God, that's right." He hadn't thought of that.

Mr. Taylor. I guess I would have to put in a slight saveat. I think your answer is correct, but there are some directions to the high pressure injection system. It may be a problem similar to the one of our house in Damascus after we got five inches of snow. We are heated with oil. The electri power failure triggered an inability to turn on the oil furance. So although we are without electricity, we could not heat the house.

Mr. Weaver. I agree, and I went into this with many on the steam significance. It turned out it is the same way.

Thank you, Mr. Chairman.

Senator Hart. Are there any other comments?

Dr. Kemeny and ladies and gentlemen, you have served not

only the President and this country and, in my judgment, well, you have served in the highest and best traditions of democracy as responsible citizens. You have the thanks of the Congress of the United States.

With that, the hearing is adjourned.

(Whereupon, at 5:45 p.m., the joint hearing adjourned.)