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THROUGH THE GLASS DARKLY;
PITFALLS ON THE ROAD OF NUCLEAR POWER

(NUCLEAR POWER AND ITS REGULATION TODAY:
CHALLENGES AND OPPORTUNITIES)

It is a pleasure to be here today to share with you some thoughts about the present state of nuclear electrical generation and its regulation in this country, and about the challenges facing the nuclear industry and nuclear regulators in the years to come.

For a variety of reasons, which I need not elaborate on here, leap years are a time for stock-taking on the part of American institutions. This may be a suitable occasion, therefore, for a dispassionate look at both the American nuclear industry and the agency that regulates it. I would like to begin with a brief retrospective view of nuclear power issues as they stood when I became Chairman of the Nuclear Regulatory Commission 16 months ago, and then to discuss what I see as the central issues today. Please note -- although this discussion will be directed to power reactor issues, there are other important areas of the NRC's responsibilities -- nuclear medicine, for instance -- that cannot be, and are not being, neglected. Today, however, I would like to keep the focus on nuclear power reactors.

Sixteen months ago, I saw five issues as central agenda items for the NRC, not necessarily in this order: nuclear waste disposal; the certification of standardized designs; streamlining the licensing process; license renewal for aging reactors; and the achievement of greater openness of NRC's own processes. Of these issues, all but the last are for the most part prospective;

they involve making decisions in the present which will have significant effects in the future. In each of these areas, I think the Commission has made considerable progress; if complete solutions are not yet at hand, at least we are on the right track, and I do not propose to discuss these issues in detail today.

Instead I would like to concentrate on what I see as the immediate problems of the present. In my view there are three: first, further progress toward an open regulatory process, as the keystone of public credibility, on which, in turn, the future of nuclear power depends; second, the achievement of a more uniform level of excellence on the part of the nuclear utility industry; and third, a greater appreciation, on the part of all concerned, of the basic economic realities that are a critical component of rational decisionmaking in the nuclear area. Finally, in recognition of the fact that this is a meeting of the European Nuclear Society as well as the American, I would like to offer, as a separate matter, some thoughts about the current state of nuclear reactors in Eastern Europe and the former Soviet Union, and the efforts to improve their safety.

Openness

A year and a half ago, in testimony at my Senate confirmation hearings, I put great emphasis on the importance of openness and candor in Commission processes. I said -- if you will forgive my quoting myself:

> "I want to stress particularly the NRC's obligation to inform the public. In my view, when it comes to licensing a nuclear facility, the judgment on safety of the technical experts -- both in-house and independent experts -- deserves great weight. So is the endorsement of the NRC's decisions by reviewing courts. But in the long run, none of these will matter if the American public does not have confidence in the competence, the integrity, and the candor of the regulators who are making the decisions."

I said also that it was the NRC's obligation "not only to keep the people's representatives in Congress `fully and currently informed,' as the law requires, but to increase the NRC's efforts to reach out to the public at large, to recognize how important public credibility is to the achievement of its regulatory goals."

I don't propose to try to assess here how successful we have been in fostering openness and building our credibility with the public. That is not my point. My point, rather, is that everything I have seen, everything I have learned in 16 months at the NRC confirms to me how critically important it is to foster

public credibility, and that this cannot be achieved by anything other than candor and straight talking. That means talking about weaknesses as well as strengths. Both are an important part of the picture; we deprive the public of a realistic view of the nuclear industry today if we emphasize either one to the exclusion of the other. I will return to that point shortly in the context of discussing the current state of nuclear power plant safety in this country.

The nuclear industry, and perhaps nuclear regulators as well, have sometimes acted as though public participation were a necessary evil rather than a positive force in NRC processes. I think that such an attitude, though readily understandable, is short-sighted. First, the interested public often does have a valuable substantive contribution to make. Moreover, a process from which the public is shut out is a process in which the public will have no confidence, even if there are 20 Nobel Prize winners willing to swear on a stack of ASME standards that the result is technically sound. It is all too tempting for engineers and scientists to believe that decisions about complicated technical questions should be left to the experts. But like it or not, public credibility cannot be achieved without public participation, and without public credibility, nuclear power in the United States will never see a renewal. I say that not because I am a promoter of nuclear power, but as an observation about what is in the nuclear industry's own self-interest.

Regrettably, some elements of the nuclear industry, ever since the expansion of nuclear power slowed abruptly in the mid-1970's, have been more comfortable making excuses than in finding solutions. Sometimes the blame is fixed on intervenors in nuclear licensing proceedings; sometimes on excessive regulation by the NRC. I do not argue that every intervenor has played a highly constructive role, nor that the NRC cannot do more to assure that each of its regulatory actions, and each of its rules, is justified in terms of its benefit. What I am suggesting, however, is that the nuclear industry must also take a hard look at itself, and recognize that it has some problems that need to be addressed from within. And that brings me to my second point, the need for a more uniform level of excellence within the nuclear industry.

Excellence

In discussing the need for excellence on the part of nuclear utilities, I am emphatically not here simply to urge everyone to do an even better job of running their nuclear plants. Cheerleading is not part of my job description. My point is a different one. Let us take as a starting point the fact -- and I do not think there can be much dispute about it -- that the best American nuclear reactors are as well operated and as well

maintained as the best reactors anywhere in the world. There are eight plants on the NRC's list of consistently good performers whose utilities do not need to be told to do a better job, because they are doing an excellent job already. (I do not say that to encourage complacency, either -- just to give credit where it is due.) I think that the affected public knows about these good performers, and that people in their service areas, whatever their general concerns about nuclear power may be, are willing to acknowledge that their own local utility, at least, is highly competent. (Parenthetically, I noted with great interest Zack Pate's recent speech in Atlanta, in which he presented data showing that there is a correlation between a well-run plant and a money-making plant.)

The problem, therefore, is not that American ingenuity and managerial skills are incapable of excellence in running nuclear power plants; rather, the problem is that there is so great a disparity between the best and the worst performers. When the public sees seven units on the NRC's "watch list," at the same time that there are eight units on the list of good performers, people ask, and reasonably so, why this gap exists. If excellence is achievable at some plants, why are other plants mired in mediocrity? An industry that depends on public confidence will never succeed in conquering public skepticism about new construction so long as people think that the odds are even whether a proposed new plant will wind up on the list of good performers, or on the watch list.

I realize that there is one easy answer -- for the NRC to get rid of its lists and avoid the bad publicity for the weaker performers -- but it takes only a moment's thought to realize that this is no solution at all. A sensible person whose doctor diagnoses a problem will ask for a prescription rather than demand silence. The time for industry to complain about watch lists will be when the underlying weaknesses have been cured.

Choose whatever metaphor you like -- a chain of 100 links, a convoy of 100 ships -- but the message remains the same: the weak performance of a few plants, and the inability of many more plants to rise to within at least hailing distance of the best, is of course a matter of concern to the NRC, but it should also be of grave concern to the industry as a whole. Naturally, every nuclear utility's first priority is its own power plants, and its own particular relationship with the regulators. I am not suggesting that it should be otherwise. But in addition, it behooves each nuclear utility to bear in mind that the performance of every other link in the chain, or every other ship in the convoy, has a direct bearing on its own interests. No one in this room needs to be told what the consequences would be for the nuclear option in the United States if there were to be a major accident at any American plant.

The industry must do more to press its weaker members to improve and to assist them to do so. The more industry can do on its own to put its house in order, solving problems itself rather than waiting for the regulators to act, the less the NRC will have to do in the way of prescriptive measures. Let the industry take the initiative in designating model performers, setting performance standards, and exercising what might be called peer pressure on those utilities that fail to measure up.

This is a challenge to the nuclear utility industry, but in it lies opportunity as well. The NRC does not believe in regulation for the fun of it. We want to be able to apply our resources to the areas of real need, and correspondingly, to decrease our efforts as the need diminishes. On a generic basis, we are already in the process of reviewing our regulations to determine which of them are unduly burdensome in proportion to the benefit that they provide. We have challenged the industry, if it thinks that there are such non-cost-effective regulations, to come in with the data -- hard data, not just unsupported rhetoric -- to support modification or repeal of a given regulation.

That approach applies to individual reactors as well. The SALP process is one way in which we are already applying this principle. The better the performer, the less the need for NRC to intervene on a day-to-day basis, the less intrusive our level of inspection and prescriptive regulation, and the more NRC's function can become what it ideally should be: essentially one of auditing the licensee's programs.

Therein is the carrot. Excellence is in everyone's interest. Greater excellence on the part of utilities, with weaker performers moving up to a level closer to that of the best ones, not only serves the NRC's interest in assuring public health and safety but also the short- and long-term interests of individual utilities and the industry as a whole. This kind of effort by the nuclear industry can mean not only greater assurance that one weak performer will not imperil the position of every other utility; it can also mean less intrusive NRC regulation and economic benefits as well.

Economic Realities

The most salient economic reality confronting nuclear utilities today is the crucial importance of license renewal. Anyone who ever thought that license renewal was an issue that need not be dealt with for another decade, when plants would be reaching the end of their 40-year license terms, should know by now that decisions about capital investments are being made continuously, and that license renewal is crucial to rational decisionmaking on these investments. For a utility deciding whether to make a significant capital improvement in a plant, it

is absolutely essential to know whether that investment will be amortized over a 30-year span or only the 10 years remaining in the license term. A utility which lacks some degree of assurance that the investment will be useful over 30 more years of operation may feel it has no choice but to shut the plant down rather than upgrade it to meet safety assurance requirements. Without a vigorous license renewal program, therefore, we can expect some premature shutdowns of plants, even though such shutdowns run counter to the national interest in maintaining supplies of electricity and to the utilities' economic interests. We at NRC cannot and will not sacrifice safety to keep a plant operating, but we can and will do everything possible to make sure that a strong and clearly defined license renewal process is in place. It is therefore incumbent on us, I believe, to redouble our efforts in this area.

I referred earlier to Zack Pate's comments on the relationship between safe performance and good economic performance. In broadest terms, just as the nuclear utility industry faces the challenge of achieving a more uniform level of excellence, it also faces an economic challenge: that of surviving the economic test in an increasingly competitive electrical marketplace. I would like to offer some thoughts on the economics of the industry, speaking not as a regulator, and certainly not as a promoter of nuclear power, but rather as an observer of the economic scene and its public policy implications.

Today, ratepayers, bondholders, shareholders, and public utility commissions are all demanding, as never before, better financial management of utilities, and this in turn is creating unprecedented economic pressures on the nuclear utility industry. It seems to me that the trend toward greater involvement by PUCs in utilities' economic decisionmaking, while salutary overall, has at least one possible drawback as well: a tendency to focus so narrowly on the issue of what is the least costly means of obtaining power in the short run, that longer term benefits may be overlooked. With Canada a large and efficient producer of electricity, with the regulatory climate favorable toward independent power producers, and with the potential for "wheeling" large amounts of power across systems, the marketplace is quickly becoming much more of a "spot" market. Currently, natural gas prices are low, and construction of new pipelines is economically attractive. But just as the wise individual investor knows that developing a balanced and diverse portfolio usually makes better sense than invariably seeking the quickest profit, it may be that excessive reliance on the least expensive energy option may leave the nation undersupplied with electrical generating capacity at some point in the future, or unable to adjust to unexpectedly changed circumstances. An unforeseen interruption in the supply of one energy source, or a decision to

place a much higher priority on the prevention of global warming, could leave a void in the national energy supply.

Indeed, there is no single greater challenge facing the incoming Administration in the energy field than the problem of translating a national energy strategy -- in which plans are made for reliance on diverse energy sources -- into what are much more localized decisions by PUCs. If PUCs focus narrowly on least-cost options, the diverse energy portfolio that is so important to the overall national interest will never be achieved, for every PUC will be looking to the same energy source at the same moment in time. I don't mean to suggest that there is no place for looking narrowly at the issue of what is the least costly option; but as a nation, we need to be able to take the long view and the broad view as well.

There is no simple way to achieve diversification, no simple formula that will yield the correct result if only you punch in the right numbers. This is a national issue, needing to be addressed at the national level.

Thus while I agree with Zack Pate that for the nuclear utility industry, control of operating and maintenance costs is important, I believe that this is only part of the problem facing the industry. More broadly, the issue is how to make sensible economic decisions in a world in which strong forces may take an unduly narrow view of what is economically desirable.

Some of these broad issues, of course, are not within the NRC's purview to solve; but we can and do commit ourselves to work unstintingly to see that a solid license renewal program is put in place as rapidly as possible. Deeply interrelated with license renewal is the need for progress toward a long-overdue solution of the nuclear waste disposal problem. What we are looking toward, ideally, is a process in which there are assured answers to two questions -- (l) What does it take to assure that a plant designed for 40 years can operate safely for 60 years? and (2) What will be done with existing and newly generated waste? -- so that utilities can make rational decisions based on the third question, which is: Given the answers to questions (l) and (2), are the economics of license renewal attractive? In that way, nuclear utilities will have the tools they need to make rational decisions in a world in which the equations have too many unknowns.

Eastern Europe and the Former Soviet Union

Finally, I would like to share with you some perceptions of the current state of nuclear safety in the nations of Eastern Europe and the former Soviet Union (FSU), as well as of the multinational efforts to cope with problems there. I recently returned from a three-week trip to the area -- my second since

becoming NRC Chairman -- and returned heartened by some things I saw, while still deeply concerned at the magnitude of the tasks that lie ahead.

My trip in fact began with a meeting in Paris with my counterpart senior regulators from G-7 countries plus Sweden and Finland. These 9 countries are providing essentially all the safety assistance that is going to Eastern Europe and the FSU at this time. The Senior Regulators agreed that while we support the G-24 effort for the overall coordination of safety assistance, it will be a lengthy process, and that it is therefore necessary to have a more comprehensive analysis, from the top down, to see who is providing assistance where, so that we can determine where the major safety gaps are. There was general agreement too that the process of upgrading safety in Eastern Europe and the FSU needs to be jump-started, because while there has been real progress in the short term, the process of solving the longer-term problem has barely begun. The hard fact is that the Chernobyl-type reactors are too unsafe to be run comfortably, and taking them out of service means finding a way of replacing the power they generate -- and this at a time when the nations of Eastern Europe and the FSU have been experiencing economic dislocation and hardship on an enormous scale. It is a daunting problem; but the problem will not go away by itself. It must be addressed.

With respect to the overall Lisbon Initiative and the SEED money (Support for Eastern European Democracy), we are off to a good start. There continues to be disagreement within the international community as to whether the preferred approach is multilateral or bilateral agreements. The position of the United States Government, which I think is the correct one, is that short-term corrective action should be handled bilaterally, with the longer-term initiatives left to multilateral efforts. While we have made strides in the past year, I share the widely felt sense of frustration at the ponderousness of the international coordination process, and I do not see any benefit in holding long-term discussions at this time.

One encouraging note was the state of operations at Hungary's Paks facility, where four Soviet-designed pressurized water reactors -- good and solid if also small and old-fashioned -- are being run very well, in my opinion. The operation is impressive not only for the quality of work but also for the initiative shown by plant managers. Paks exemplifies what seems to be the rule in Eastern Europe: where there is a real drive for safety, it comes from plant operators and managers, not from regulators. It is no coincidence that the prevailing view in Hungary is that if an accident occurs, it is not the fault of the designers, nor of the regulators, but of the utility. The

utilities hold themselves accountable, and they rise to that challenge.

In Lithuania, I visited the Ignalina site, which has two of the modern versions of the RBMK (that is, the Chernobyl type of reactor), as well as portions of a third, under construction at the time of the Chernobyl accident and left unfinished. While the Ignalina reactors have many of the drawbacks common to the RBMKs, I must say that they were better than I had expected. The facility, run by a crew made up entirely of ethnic Russians, appeared to be fairly well run and maintained.

In Russia, the situation remains static. The Russians are getting small amounts of assistance from the G-7; in addition, the Swedes and Finns are helping address problems relating to the RBMKs. Overall, the central problem is an unwillingness, so far, to face up to the enormous task of taking a generation of unsafe reactors out of service and finding the resources -- some $5 billion of loan assistance will be needed -- to build sources of replacement power. In addition, there has yet to be a willingness to recognize that organizational reform on a large scale is needed, not just better operation and regulation of existing plants.

I don't want anyone to think that the United States is the fount of all wisdom on nuclear matters; we import information as well as export it. We have much to learn from our nuclear partners: from the Russians about metallurgy, the Japanese about digital control, the French about standardization, and from Taiwan and Korea about construction planning. As the fact of this joint conference of the European and American Nuclear Societies testifies, what we -- and by "we" I mean the nations and peoples of the present day -- what we have in common becomes ever more important, and the divisions between us become less and less significant. We're all in this together.