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REMARKS BY
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LOOKING AHEAD TO THE NEXT FIVE YEARS
SOME THOUGHTS ON REGULATING EFFECTIVELY

The purpose of these information conferences is to clarify positions and to create an appreciation of perspectives. The presentations of the NRC staff and the licensees' responses can be useful immediately. The Commissioners, whose responsibilities are for policy and balance, through their participation can help provide licensees and NRC staff with individual Commissioner's perspectives useful for planning and thinking about the future.

Chairman Selin has already shared with you his views after his fast paced first year on the job. I will give you some of my thoughts after five years as a Commissioner, which included one-day visits to each of the operating nuclear plant sites in the U.S. and a number of sites outside the U.S. My views would probably be of little interest to you were it not for the fact that I will be around for another five years.

The important issues for the future are pretty well known to us all, they are: safety of operating reactors domestic and foreign; safeguards of nuclear materials at foreign reactors; license renewal, design certification and other implementation activities of Part 52; disposal of radioactive wastes; clean-up decommissioning and dismantlement of nuclear facilities; and improving the public credibility of the entire nuclear enterprise, both regulator and regulated. I will not attempt to address each of these and tell you what my thoughts on them are. My allotted

time and your post prandial attention spans rule that out.

Instead, I will give you some of the conclusions that I have come to and which will guide my thinking in the future, unless of course, I decide differently!

First, I will give you some of my views on regulation.

It has become clear to me that regulation of nuclear safety by an independent federal government agency is absolutely essential. Most other countries with nuclear power programs are coming to that same conclusion. However, regulation is like medicine in that, the proper dose cures, too much weakens rather than strengthens, and far too much kills!

I am convinced that the ministrations of the NRC have produced definite improvements in and more uniform standards of safety, and greater public acceptance of nuclear power. As a former director of a nuclear utility, I know from first hand experience that NRC's prodding, while certainly irritating, did in fact lead to faster improvement and better and safer operations.

Costs rose, but they were mostly for items that should have been invested in at an earlier date. Those increased expenditures across the entire body of U.S. nuclear plants have created the safety culture that now has taken firm root in the entire industry and which is recognized world-wide.

I also know from years of experience as a manager of managers that however well intentioned any work group of people may be, without some impetus from outside the group, complacency or worse, dry rot, inevitably sets in. NRC supplies that external prod in a publicly visible way and thereby not only keeps licensees on their toes, but also gives some degree of assurance to a concerned public.

I believe that NRC deserves credit for pushing licensees towards better and safer operations and should share some of the credit for the much improved safety and reliability performance that U.S. nuclear plants are now evidencing. U.S. plants are safe and getting safer and more reliable. NRC's activities have been very important in getting the engine started. The industry nuclear safety train is now moving and is on the right track.

Much that has taken place in the last decade and that will take place in the future has come through industry initiatives, and credit is due to the great success of those initiatives. INPO's development of performance indicators and inspection and training programs, the safety research of EPRI, and the regulatory studies that have been conducted under NUMARC have all contributed to these improvements, as have the hard work and creative independent efforts by individual licensees. There is plenty of credit to go

around for all of the progress that has been made, and NRC deserves some (but not all) of it.

Sometimes I think that regulation is a bit like sitting down and making beautiful music on a player piano. It's the pumping that produces all the results, the keyboard works itself!

However, regulation by its very nature interferes with normal unfettered management. Regulation imposes a set of priorities on management from outside the organization and sometimes (inadvertently) interferes with the ability of management to exercise its best judgment. Regulation is carried out by regulators as part of a large bureaucracy. Even with the very best motives, we regulators naturally tend to think constantly of new ways to regulate so as to do our jobs better, and the result is sometimes (but not always!) excessive regulatory creep. A most troublesome and potentially dangerous consequence of excessive regulation can be a loss of a sense of ownership by the licensees.

It has become very clear that nuclear plant performance and safety are ultimately determined by the effectiveness of the managers... the plant managers, and their superiors. Regulators must avoid as much as possible weakening the ability of managers to manage, and the accountability those managers must have for the ultimate results. Over the years there have been a few notable management failures which have decreased public confidence in nuclear power generally. U.S. nuclear power plants have yet to achieve the capacity factors originally intended or those which have been obtained in other countries. A recent study by the National Research Council entitled "Nuclear Power -- Technical and Institutional Options for the Future" suggests that improved management practices may be the key to achieving parity with the very best nuclear operations in other countries. We all have a stake in improving management practices wherever they are not up to NRC's standards or the high standards that the industry has set for itself. We at NRC must constantly examine ourselves to see that we are fostering and not hindering good management.

About one year after coming on the Commission and having talked with NRC and licensee staffs, I found myself somewhat disappointed with the technological backwardness that seemed to pervade the entire U.S. nuclear enterprise. In its infancy, nuclear power and other applications of nuclear science were the cutting edge of technology. Unfortunately for the last two or more decades, there has been a degree of technological stagnation in this industry. I attribute this malaise, in part, to the impact of regulation on an industry that before the advent of nuclear power was not known for its commitment to technological modernity.

The traditional viewpoint of the energy utility industry is perhaps

epitomized by a story told me by a senior executive of a major utility. He told me that when he was a young engineer full of enthusiasm and ginger, he was assigned to duty in a large fossil fueled power plant. He was so eager to learn everything and to make a contribution that he literally ran as he moved about the plant, until an older operating engineer flagged him down one day and said "sonny, never never run in a power plant"! He took that advice very seriously in his career. It was probably good advice. But when heavy regulation became overlaid on that careful but basically sterile philosophy, the result has been technological obsolescence. The very slow rate at which the nuclear industry has adopted the new technologies of digital electronics and information processing is testimony to the stultification that set in.

NRC is currently struggling with safety questions related to new digital instrumentation and controls and the design of control rooms in the new reactor designs that have been submitted to us. Some of these issues first arose approximately twenty years ago when the NRC staff reviewed the first digital systems with complex algorithms -- the Combustion Engineering reactor core protection calculator -- as a part of the reactor protection system, then the Westinghouse RESAR-414 Integrated Protection System, and more recently the Westinghouse RESAR-90 Integrated Protection System and the GE NUMAC product line. Issues that are now being addressed by the NRC with difficulty, could have been faced earlier by NRC if digital instrumentation and controls had been more aggressively proposed by the industry for the upgrade of current control rooms, which must be redone anyway because there are no replacements for the aging analogue systems now in use. A basic lesson learned is that in the structured software design process of digital I&C systems, provisions for verification and validation are essential. I suspect the industry's reluctance to make such proposals was their fear that because NRC had little familiarity with and an untested capability to review such proposals that it would be more prudent and cheaper to avoid any attempts to introduce new safety technology into an operating plant. The result has not only been technological obsolescence of existing plants but also a limited capability of the NRC to address such matters when forced to do so in a totally different context.

Another situation that could have been somewhat alleviated by the earlier introduction of modern information technology into nuclear power plants is the capture of the plant's current licensing basis (CLB). The CLB serves as a platform for ensuring that an adequate level of safety is maintained by licensee compliance with plant-specific design bases, legal requirements, and commitments. The CLB constitutes an enormous amount of information which must be capable of being retrieved, updated, and otherwise maintained in a useable form. Modern information technology can assist in the administrative burden of classifying the information which properly comprises the CLB. Many licensees are now having their entire

updated final SAR and other licensing documents encoded in electronic format to enable the use of powerful search algorithms for collecting information on a particular safety issue or plant system, structure or component. In my opinion, this should have started long ago as an initiative by plant management. However, I applaud the steps being taken in this direction today and encourage the careful use of modern technology wherever it can be cost effective and contribute to safety.

What are the solutions to these problems?

First, beginning at home, I believe that the NRC must ensure that it has the very strongest technological basis for everything it does. NRC must have its own technological capability to consider and review for introduction any new technology that already has had adequate testing outside the nuclear industry and appears ripe for nuclear applications. That means NRC must make some investment in expertise for which there is not yet a pressing call. For example, five years ago when I spoke before a group of NRC staff I pointed out and criticized the lack of experience with digital instrumentation and control systems at NRC. During the Q&A period I was rather strenuously challenged by someone who said "why should NRC be wasting its time on control room instrumentation when virtually none of the LERs involved I&C problems?". Today, one of the areas that both NRC and the utilities should strengthen is digital I&C systems, since control systems' aging problems are becoming more and more evident.

The next challenge that we will be forced to deal with, in my opinion, is the broader quantitative evaluation of risk through the wider use of risk assessment techniques and the application of these techniques to performance based regulation for current and future plants.

More generally, I believe that the Commission must give careful consideration to the National Research Council's recommendation that a comprehensive review be made of NRC's existing regulations as we prepare for the licensing of advanced reactors -- in particular -- advanced LWRs with passive safety features such as the AP 600 and the SBWR. In fact, I believe that such a review would be a very important and useful project even if there were no advanced designs to consider. NRC's new office of Policy Planning should help us to understand the impacts of everything we do and how we do it. We must exercise even greater care in the future to avoid creating new problems through an incomplete understanding of possible ripple effects. The biggest obstacles to a comprehensive regulatory review are the resource limitations on the Commission compounded by the requirement that NRC obtain all of its funds from licensee fees.

Second, the industry should recognize that both they and we must

guard against "under" or "over" regulation. Only the "over" question has occupied the industry's thinking, and there are still a good many people in the nuclear industry who believe that the best regulation is no regulation at all. They are dead wrong. We are still seeing the occasional knee-jerk reaction to any kind of a regulatory initiative, even if it might hold promise of improvements to safety and costs. There is still a "you can't get there from here" quality in some of our dialogues. Conferences such as this can help to remove those attitudinal barriers.

What we all must do is separate the issue from the source that identified it, try to define precisely what problem is to be solved, and seek to develop a set of reasonable alternatives for consideration. The burden for doing this falls just as much on the NRC as on the affected parties.

One problem that can and should be avoided to a much greater degree than in the past is the development of polarized positions by NRC and those affected by it that inhibit the solving or clearing up of a problem. Early sharing of thoughts is very important before positions harden which later must be broken down. Win-win situations cannot always be achieved, but too often we seem to find ourselves in a win-lose inevitability. A notable recent exception is the successful NUMARC-NRC development of a Regulatory Guide for the new NRC Maintenance Rule.

I would like to see the industry occasionally propose to the NRC new and less costly generic ways to meet safety objectives. One area that will be particularly important in the future for such considerations is decommissioning and decontamination.

Openness is vitally important in most of what we do. I have been deeply struck by the high degree of openness in the nuclear power community. There is probably no other industry that has as high a degree of openness to each other and to the public. The annual INPO CEO conferences display an unusual and healthy candor which I strongly commend.

It is unfortunate that the issue of the public release of INPO reports has been used as an indication of secretiveness within the industry. I fully appreciate the negative consequences of releasing to the general public the most candid comments in INPO reports. By making the entire report public, some of that candor and some of the value of the reports will be lost. However, the industry's total opposition to proposals to make INPO reports public reflects badly on an industry which in almost every aspect of its activities is subject to intense public scrutiny. I would suggest that INPO consider sharing with the public the basic findings of its inspection teams while keeping confidential any specific recommendations for dealing with problem areas, since these are only recommendations. Perhaps there are some other ways

of communicating to the public exactly who comprised the INPO evaluation team and what they found. Much benefit could be gained in public confidence from such releases.

In his opening remarks, Chairman Selin identified the most important and challenging issue presently facing you as licensees and us as regulators to be the re-establishment of public credibility. I agree and see enhanced public credibility coming about partly through greater openness in discussions with the public on all matters related to nuclear power, and partly through supporting the regulator of nuclear power as an effective protector of the public interest.

I suggest that in the days and months ahead each of you think of ways that you can foster openness and candor with the public in nuclear matters -- nuclear operations at your plant or in your job. Inclusiveness and public participation are distinctive attributes of our American democracy. The time has come, in my opinion, even more fully to include them in our own nuclear culture.