# NRC NEWS

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**Remarks Prepared for NRC Chairman Dale E. Klein**

**Digital Instrumentation and Control Workshop**

**Washington DC**

**September 11, 2007**

Thank you, I am very pleased to be here.

I understand that you had a very productive workshop in Atlanta last week. I hope today's workshop will provide further insights on how we can ensure that the continuing improvements in Digital Instrumentation and Control (DI&C) technology and Human Machine Interface (HMI) will provide safety benefits to nuclear facilities.

I just returned from a meeting of the American Nuclear Society in Idaho. And now I am getting ready to leave for Europe tomorrow, where I will be attending the annual meeting of the International Atomic Energy Agency. The speech I gave in Idaho, and the one I will be delivering in Vienna, are both on the subject of how the NRC is getting ready to regulate the next generation of reactors. So new technologies—such as DI&C and HMI—are definitely on my mind.

My role here today is not to give a long speech. Instead, I just want to convey a few messages, and thank you for conducting this workshop so that our staff can better understand the issues and help prepare the NRC for future nuclear technology.

I should mention that I am not alone in regarding this as an important topic. My fellow Commissioners are also highly focused on this as a crucial issue for the agency. In fact, this workshop resulted from a proposal advanced earlier this year by Commissioner Lyons, and unanimously approved by the Commission.

The first point I would like to make is this: The future of nuclear power plants is clearly in the direction of DI&C and enhanced HMI… and the NRC needs to begin preparing for these new technologies now if we are going to be able to fulfill our future regulatory responsibilities.

Let me put this in perspective by mentioning some of the important developments that are occurring within the NRC.

As you are probably aware, the combination of new technology and changing employee demographics is presenting us with several challenges, which overlap and to some degree exacerbate one another:

Both industry and the NRC are feeling the effects of the aging nuclear workforce. This fact, and the corresponding loss of experienced people, are happening right at the time that industry is prepared to grow—which means that both the utilities and the NRC need to increase the number of employees to handle the increased workload we are all facing. At the NRC, in one two-week pay period early this year, nearly 1000 years of regulatory experience walked out of the agency due to retirements; and that included 560 years of technical experience. I also understand that at last week's workshop it was reported that 75% of the workforce at the Department of Energy's National Labs will be eligible for retirement by 2010.

On the industry side, I believe that Nuclear Energy Institute will soon publish its updated nuclear industry workforce survey. One finding which they have already released is this: roughly 35% of current utility personnel will be eligible for retirement within 5 years. This is not a crisis… yet. But it has the potential to become one.

I should mention that the need for workforce development is not just limited to nuclear engineers, but also includes other engineering and scientific disciplines as well… not to mention the skilled craft workers such as DI&C technicians, electricians, welders, pipe-fitters, mechanics, and others needed to construct and operate the plants.

My second point concerns another challenge we face. Because the growth of the nuclear industry was basically stalled for two decades in the U.S., there has been substantial progress in nuclear technology elsewhere in the world that you as operators, and we as regulators, don't really have experience with. Specifically, while the current fleet of light water reactors were designed and built in the analog electronics era, the next wave of reactors will likely move away from analog toward DI&C—in the short term—and also away from light-water toward advanced reactors over the long term.

What does the combination of all these factors mean? Simply this: our most senior people—the people whose experience and judgment will guide the "Nuclear Renaissance"—are not trained in the technologies that will characterize that Renaissance. Yet, at the same time that we need to prepare for next generation of nuclear technology, we will also need to maintain expertise in existing technologies, because the focus on the safety of the existing fleet must remain paramount. So I am very grateful that you, the experts in DI&C and HMI, are attending this workshop to help us understand the challenges we face, and help us figure out ways of meeting it.

Probably the key concern for us as regulators is understanding how new technologies will maintain the core safety principle of Defense in Depth—which brings me to my final point. We need to have a very clear understanding of how DI&C and HMI systems guarantee diversity, redundancy, and independence.

While the NRC recognizes that DI&C and HMI hold great promise for improving efficiency of plant operations, and can be very beneficial for utility owners, our concern as regulators is always safety first. I know that all of you share this concern, and I recognize that plant operators deal with this issue every day. Even before we started grappling with DI&C, the crucial importance of HMI was underscored by the Three Mile Island accident. Following that event, the NRC required plants to undertake detailed control room design reviews and make human factors improvements to them.

Therefore, we need to work together to understand not only the benefits of these digital systems, but also their possible failure modes, and the means by which these systems can be designed to fulfill the demands of diversity, redundancy, and independence. With these tools, the NRC will have the means to evaluate these new technologies, and uphold our responsibilities for safety and security oversight.

I promised that my remarks would be brief, and since I am always saying that the NRC must be a stable and predictable regulator, I am keeping my word.

Thank you once again for the opportunity to participate in this important conference, and allowing me to share a few thoughts with you. I look forward to hearing about the outcome of this workshop at a later date, and learning more about the issues we all face in the areas of Digital Instrumentation and Control and Human Machine Interface.

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