

REMARKS BY
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FOR THE PANEL ON POST-TMI IMPROVEMENTS
25TH ANNIVERSARY TMI-2 ACCIDENT PRESENTATION
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Thank you, Mr. Chairman, for a compelling discussion on the significant strides in safety management and emergency preparedness that have been accomplished by the NRC over the past 25 years. I also want to join the Chairman in complimenting Sam Walker both for his presentation today and for his recently published history of the Three Mile Island event, which I believe is the single best discussion on the subject.

A theme that you will see run through all our talks is that NRC and the industry it regulates must avoid the complacency that contributed to the TMI accident now and in the future. And we must be dedicated to continual improvement in our programs.

I am going to focus on the area of control room operations and the advances that have been achieved there over the past 25 years. I should note at the outset that the improvements I will discuss were not made by NRC alone, but often in partnership with a key institution that industry itself formed in the wake of the TMI accident, namely the Institute of Nuclear Power Operations (INPO). The Kemeny Commission had strongly recommended that the nuclear industry set and police its own standards of excellence. In response INPO was created and from its very inception has had as its central focus the pursuit of operating excellence as a goal for all of its members. In operator training, the NRC has often been able to rely on INPO initiatives, including the INPO certification of licensee operator training programs, although we continue to inspect licensee

operator training programs on a sampling basis and to administer operator license exams. The NRC-INPO relationship has been a fruitful partnership.

Perhaps the most significant improvements in control room operations today compared to the TMI accident are in the procedures that operators turn to and follow when an event occurs. The procedures in place 25 years ago provided careful, detailed, and technically sound methods to mitigate accidents and transients. One weakness, however, was that operators often were required to correctly identify the accident while it was in progress in order to know which of the many procedures would be best to use. To accomplish this, operators were provided with a great many instruments, gauges, dials, lights, and alarms. The NRC required then -- and still does -- that all plants be conservatively designed and robustly constructed, with great defense in depth. This was done precisely to ensure that control room operators would have ample time to survey their indications, to diagnose ongoing events, and then to implement effective mitigative strategies. The plant was rugged enough to remain safe for some time while operators decided what to do. Nonetheless, human error was hardly impossible amidst so many signals, lights, sounds, and displays. And that is what happened 25 years ago, at Three Mile Island: human error, when the operators misinterpreted certain indications and turned off safety equipment that was keeping the plant safe.

The difference today is that, simply by following the symptom-based procedures now in place, operators will mitigate the event without the need to fully understand it or identify its exact cause. Their actions are directed in response to displayed symptoms,

rather than following a diagnosis made under the stressful conditions that they would surely face during an accident.

Another very important development involves the extensive use of power plant control room simulators. Before 1979, a lot of training involved walk-throughs, with operator candidates explaining to their trainers just what they were doing, what they were looking for, etc. Those who were administering tests to candidate operators had to do the same thing, informing candidates what the gauges displayed, what alarms were sounding, etc. Advances in information technology since TMI have allowed the NRC to mandate that plants acquire advanced, computer-driven simulators that faithfully duplicate their own power plant control-rooms right down to the location of individual switches on the panels.

It's not just that the simulators are convincingly real - though they are, right down to the chairs the operators sit in. More importantly, they are of such scientific fidelity that postulated accident scenarios, including the one that actually occurred at Three Mile Island 25 years ago, can be accurately reproduced on them. Similarly, actions taken by operators can be tested and evaluated both for effectiveness and feasibility of implementation. Operating shifts can now be evaluated as teams, including information flow and command and control. Evaluators and human factors specialists now witness how data and indications get interpreted, how knowledge is developed and communicated, and how decisions are made and implemented. In effect, reactor operators get their training on accurate simulators, just like military and airline pilots and NASA astronauts.

In summary, operators are now trained, tested, and periodically exercised under conditions that are virtually identical to what they would experience in the actual control room. They -- and the testers grading them -- get to see, to hear, to virtually experience accident scenarios in real time. The result has been a tremendous upgrade in quality and quantity of operator training and the ability of evaluators to properly assess performance.

The third area of improvement in control room operations that I'd like to mention does not really involve the control room at all. In fact, the importance is in what control room operators do NOT have to do.

After TMI, the NRC mandated that plants establish two additional facilities separate and removed from the control room: the Technical Support Center (or TSC) and the Emergency Operations Facility (or EOF). After the onset of an accident, these two facilities are manned by senior support staff and are provided with instruments and monitoring capability apart from the control room. The personnel at these facilities take over tasks and responsibilities that otherwise would fall on the shoulders of those in the control room. These tasks include obtaining additional outside resources and manpower, such as engineering and repair teams, and participating in offsite emergency planning decisions, including interfacing with State governors and the media. By staffing the TSC and the EOF with personnel specifically trained in those communications duties, those tasks are placed in the hands of individuals for whom that is their main job, while lightening the load of control room operators whose

attention should remain focused on operating plant safety systems to best mitigate the event.

There are many other improvements I could mention as well. I'll just name three more without really going into detail. The creation of the Shift Technical Advisor ensured that a degree of theoretical scientific knowledge would always be available to operators on a 24-hour-a-day basis. Instrumentation and human factors improvements in the control room made the operator's job easier during accidents. Guidance was issued limiting overtime to assure that operators would not be handicapped by fatigue when an accident began.

We take our responsibilities in this area very seriously. Much of our focus at Davis-Besse in recent months has been on the assessment of operations and operator preparedness to resume power operations. Part of the draft confirmatory order proposed last week by the NRC staff requires an independent assessment of operations annually through 2009. Through our own oversight processes and these independent assessments of operations, safety culture, corrective actions and engineering, we will ensure that there is no complacency at Davis-Besse going forward.

We have by no means reached an end point in our efforts to improve control room operations. The ongoing revolution in information technology will surely give us new tools to exploit going forward, both for the existing generation of reactors and especially for future generations of power reactors.

Let me now turn the program over to Commissioner Merrifield who will focus on the enormous improvements in communications capabilities available to us today compared to 25 years ago.