



NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

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No. S-04-009

The 3rd Annual Homeland Security Summit

Session on, "The Best-Laid Plans: A Case Study in Preparedness Planning"

The Very Best-Laid Plans (the NRC's Defense-in Depth Philosophy)

Remarks of Nils J. Diaz
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June 3, 2004

Preparedness and Defense-in-Depth

As the title of this session suggests, "the best-laid plans of mice and men often go astray" -- I won't attempt Robert Burns' original Scottish version -- but, I believe that the *very best-laid plans* can accommodate many imperfections, weaknesses, or failings. The NRC has long had a philosophy that accommodates this reality. We call it our "defense-in-depth philosophy". It is really more than a philosophy: it is an action plan, an approach to ensuring protection. The concept of "defense-in-depth" is a centerpiece of our approach to ensuring public health and safety, and it goes beyond pieces of equipment. It calls for, among other things, high quality design, fabrication, construction, inspection, and testing; plus multiple barriers to fission product release; plus redundancy and diversity in safety equipment; plus procedures and strategies; and lastly, emergency preparedness, which includes coordination with local authorities, sheltering, evacuation, and/or administration of prophylactics (for example, potassium iodide tablets). This approach addresses the expected as well as the unexpected; it actually accommodates the possibility of failures. The NRC's defense-in-depth has recently been strengthened by incorporating the dynamics of risk-informed and performance-based decision making.

Integrating Safety, Security, and Emergency Preparedness

The events of 9/11 brought to this country a new recognition of the importance of physical security and emergency preparedness in the world of 21st century America. In the case of the NRC and the nuclear industry, this awareness had already come decades ago, and to that extent, we were, so to speak, ahead of the curve. For a generation, our regulations had postulated the existence of a terrorist

threat, as part of the defense-in-depth approach. Thus the kind of drastic changes in security seen in the airline industry, for example, were not required for nuclear plants, because we had put those structures in place long ago. To be sure, we faced new realities, and significant enhancements were made after 9/11. Security orders were issued on February 25, 2002, that tightened existing policies and procedures in the light of the most current information, but it was not a wholesale revamping of our entire regulatory structure. We then continued to make additional improvements. We were among the best prepared then; we still are among the best prepared now.

What the post-9/11 review of security issues highlighted is how tightly interconnected are reactor safety, security and emergency preparedness. Many of the same issues are involved in avoiding and mitigating reactor accidents as in preventing and mitigating acts of terrorism. Though the initiating events may differ, defense-in-depth applies in very similar ways to both.

Since 9/11, the whole of the U.S. government, state and local authorities, and many elements of the private sector have responded in a manner that increases our security. The NRC has worked closely with the Homeland Security Council, the Department of Homeland Security, NORTHCOM, the FBI and other agencies to enhance the nation's overall detection, prevention, mitigation and response capabilities. Federal action at the airports and on airliners, for example, surely reduces the likelihood of terrorists using commercial aircraft against nuclear facilities or any other targets. It is clear that we have made significant progress in the past year toward achieving an integrated response program for the defense of nuclear facilities. For our part, the NRC has required enhanced security measures for the defense of nuclear power reactors. These include multiple, but strongly interdependent elements, all directed to one fundamental goal: how best to protect our people, with the appropriate resources placed at the right places. These elements are:

- Enhanced access controls, to prevent unauthorized entry of persons and materials to nuclear facilities;
- Enhanced work and training requirements for security personnel, to increase their capability to detect and respond to threats;
- Enhanced Force-on-Force security exercises at nuclear power plants;
- Revised Design Basis Threat (addressing vehicle bomb threats, land-based and water-based assaults) and associated defensive capabilities;
- Enhanced mitigation procedures and strategies based on the established concept of Severe Accident Management Guidelines and using the results of extensive vulnerability studies;
- Enhanced emergency preparedness.

Also, the NRC has conducted extensive analyses of the potential vulnerability of nuclear power plants to aircraft attacks. While these analyses are classified, the studies confirm that the likelihood of damaging the reactor core and releasing radioactivity that could affect public health and safety is low. The fact is that nuclear reactor design requirements for structures to withstand severe external events (hurricanes, tornadoes, and floods), and for safety systems to include redundant emergency core cooling, redundant and diverse heat removal, fire protection features, and station blackout capabilities, provide built-in means of dealing with attempted terrorist attacks. Existing emergency operating procedures and enhanced severe accident management guidelines are well suited for mitigating the effects of accidents or intentional attacks on nuclear power plants. In addition, all nuclear power plants have been required to enhance the integration of safety, security, and emergency preparedness. Given these enhancements, the potential radiological consequences to the public of an aircraft attack are low.

Further, the studies confirm that even in the unlikely event of a radiological release due to terrorist use of a large aircraft, NRC's emergency planning basis remains valid. Defense-in-depth provides the time needed to use the right protective strategies. The people of our country will have the protection they need and deserve. The Nuclear Regulatory Commission is joined by other Federal agencies, led by DHS, and by state and local authorities in assuring that our people will be protected.

The analyses, conclusions, and insights that I just presented for nuclear power plants also apply to spent fuel pools, since they are also well engineered and protected structures, and are amenable to simple and effective mitigative actions, if needed. For a dry spent fuel storage cask, it is highly unlikely that aircraft impact on a cask would cause a significant release of radioactive material. In addition, results to date show that a large commercial aircraft crashing into a transportation cask would not result in a release of radioactive material.

Defense-in-depth works for nuclear facilities. It is definitely a case study in total preparedness planning.

In summary, I believe that the NRC and the industry have done their jobs well, planning for success in safety and security but ever prepared to deal with the expected as well as the unexpected. We have assessed what needed to be done and we have done it. The NRC, other government organizations, and the licensees have taken action to protect the people of our nation.