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NEWS

USNRC reviews and discusses its Fukushima response

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The United States Nuclear Regulatory Commission has convened for the second of three 30-day reviews of responses to the Fukushima Daiichi emergency.

At the meeting, NRC commissioners and staff discussed the two Temporary Instructions sent to inspectors, a bulletin issued to utilities, and the work of a task force convened to make recommendations.

The first instruction, of 23 March, was for resident inspectors—NRC employees working at the plant—to review station arrangements for emergencies such as station black-out and large fires. Those investigations, which have been reviewed and published on the NRC web site, did find some deficiencies, but none which would have affected safety functions, according to Martin Virgilio, deputy executive director for reactor and preparedness programs.

The second instruction, of late April, concerned severe accident management guidelines. These voluntary standards date from the 1990s. Again, no serious functional failures were found, however there were deficiences in the availability of equipment and in procedures. Later in the meeting, Virgilio confirmed that utilities had either made improvements requested by the NRC, or was in the process of doing so.

The third item was a bulletin to utilities about mitigating strategies issued in mid-May. Virgilio said that the agency had reviewed most of the 30-day responses, about whether necessary equipment was available, or whether a mitigating strategy is executable, and so far there had been no major problems. In mid-July, resports from utilities on maintenance, testing and equipment reliability were due.

The last item covered at the meeting was the work of an NRC task force set up to make recommendations from the Fukushima incident, headed by Charles Miller. His presentation was divided into several parts. First, he said that as knowledge of natural phenomena has evolved over time, regulations have changed. That has resulted in plants of different ages having different licencing bases. Fixes implemented at older plants have improved the safety margin, but have not changed the underlying regulatory basis, he said. Later, responding to a question, he said, "We are trying to determine what this means...there are things learned that can be applied to all plants in logical and methodical way, so that any gaps addressed." He said that the taskforce was working to turn these insights into recommendations. He added that the task force's biggest principle was to make sure that equipment was shown to be reliable, so that it would work when called upon.

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Second, he said that in terms of the mitigation of station blackout, US requirements have in the past addressed the risk of offsite power failure and onsite power failure independently. The onsite power safety strategy has focused on demonstrating the reliability and redundancy of emergency backup diesels. Although they can operate to keep site systems running for 48 hours, as the Fukushima event has shown, they may need to run for much longer. No work has considered the risks and consequences of a natural event knocking out both. Furthermore, current requirements for mitigating explosions and large fires (the B5B regulations put in place after the 9/11 attacks) are not designed to safeguard protective equipment from flooding or seismic events. Furthermore, the regulations do not require resources to respond to a multi-unit event, he said.

Third, a complicating factor in US plants is the amount of voluntary codes of practice taken up by the industry. For example, the 23 US BWR plants with Mark I containments have all installed hardened containment vents to remove hydrogen in an emergency. These requirements were implemented voluntarily, based on BWR Owners' Group general design criteria. However, their designs vary in factors such as the number and location of valves, their means of opening, whether or not they include rupture disks, and so on. In addition, these design criteria were designed to deal with decay heat removal, and not a long-term station blackout. Plans of systems to mitigate beyond-design basis events, which are not regulated, do not have uniform quality assurance systems.

The taskforce's final report is due on 19 July.

The taskforce will continue beyond the report; it is now planning to assemble a steering committee of senior office directors for a long-term review, which will, among other work, take lessons learned generated by the short-term taskforce and apply them to other licenced facilities (beyond power reactors).

"It has been a time of reflection," said Gregory Jaczko, NRC chairman. "There was a belief that you wouldn't see an event like this, that we had done everything to take an event like this off the paper." He observed that existing US infrastructure for a nuclear accident was based on the idea of a large and early release of radioactivity in the existing fleet. However, what actually happened at Fukushima was a long-term release.