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Role of Regulators in Assessment of Preparedness of Nuclear and Radiation facilities against Natural Calamities

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The events of earthquake, tsunami, and subsequent nuclear accident at Fukushima, Japan have provided us a warning about the possible consequences on nuclear safety arising out of natural calamities. The event has raised a lot of emotions worldwide against the whole nuclear community. However it is the responsibility of all the stake holders to keep a rational eye on this event. The whole nuclear community in the world responded to address the specific issues w.r.t preparedness against natural calamities.

The natural calamities considered are earthquake; flooding due to excessive rain fall with high tide, storm surge and wave, tsunami and dam failure. The facilities are therefore being investigated for the beyond design basis scenario arising out of natural calamities similar to the one in Japan and assess the ability to cope up with the possible consequences. The important parameter considered is maximum peak ground acceleration of the civil structures, for which the plant/facility is designed. The possible consequences like sloshing, land slide due to earthquake etc. are taken care. The degradation of the old facilities due to aging process is also considered. The other parameter considered is flooding which may occur due to excessive rain fall during the high tide, storm surge and storm wave, tsunami and dam failure. It is essential to keep the safety critical equipments at safe height to avoid black out conditions during heavy flooding. This aspect has been addressed by redefining the safe flood level based on a heavy rainfall which affected the facilities lying below the safe flood level.

Subsequent to the 2004 Indian Ocean tsunami, a detailed exercise is in progress at nuclear and radiation community of India for estimating the maximum tsunami wave heights that can possibly be generated from the sub-sea faults around the Indian coasts using validated computer codes for analysis. Work done so far indicates that the maximum postulated flood level (based on a tsunami generated from the strongest possible sub-sea earthquake caused by the Andaman-Nicobar-Sumatra fault) will get revised upwards for eastern coast of India. Many facilities are located at considerable distance from the shoreline and are not vulnerable to flooding due to tsunami.

Detailed investigation on indirect consequences like knocking out of all external and internal power supplies, hook up of power supply and coolant as corrective measures have been carried out. Common emergency services like fire, civil maintenance and their command line have also been reviewed. An action plan on readiness of plant specific emergency preparedness in case of natural calamities has been drawn and placed into effect.

This paper summarizes about the role of regulatory body and the Technical and Scientific support Organisations (TSO) in enhancing safety and security of the nuclear and radiological facilities during natural calamities which are beyond the design basis for the particular plant/facility.

Country or International Organisation

INDIA

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