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EXPERIMENTAL SEISMIC QUALIFICATION OF DIVERSE SAFETY ROD AND ITS DRIVE MECHANISM OF PROTOTYPE FAST BREEDER REACTOR

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Prototype Fast Breeder Reactor (PFBR) has two independent and diverse fast acting shutdown systems. The mechanisms that handle Control & Safety Rods (CSR) are called Control and Safety Rod Drive Mechanism (CSRDM). CSRDM & CSR are for start up, control of reactor power, controlled shutdown and SCRAM of the reactor. The mechanisms that handle Diverse Safety Rods (DSR) are called Diverse Safety Rod Drive Mechanism (DSRDM). There are 9 CSRDMs and 3 DSRDMs provided. DSR serves to shutdown the reactor on demand and are in fully raised position during normal reactor operation.

CSRDM/DSRDM consists of independent sets of sensors connected to two reactor protection logics of different designs. The output of either of the reactor protection logic system is capable of ordering safety actions through SCRAM signal by de-energizing electromagnet of CSRDM & DSRDM.

As part of seismic qualification, full scale DSRDM along with DSR was extensively tested at room temperature in water for two earthquake levels, namely Operation Base Earthquake (OBE) and Safe Shutdown Earthquake (SSE). Drop time of DSR and its mobile assembly at different instant of dropping from the beginning of shaking were obtained. Full insertion of DSR within the stipulated time and healthy functioning of DSRDM during and after seismic testing have been demonstrated. The details of seismic testing carried out for DSRDM is presented in this paper.

Country/Int. Organization

India/ IGCAR

Primary author: Mr MARIMUTHU, nimala sundaran (IGCAR)

Co-authors: Mr PILLAI, Puthiyavinayagam (Indira Gandhi Centre for Atomic Research); Mr S., RAGHUPATHY (Indira Gandhi Centre for Atomic Research, Kalpakkam); Mrs R, Vijayashree (IGCAR)

Presenter: Mr S., RAGHUPATHY (Indira Gandhi Centre for Atomic Research, Kalpakkam)

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