

## **Over Exposure of Workers Beyond Annual Regulatory Limits at KAPS**

Kakrapar Atomic Power Station (KAPS) is a twin unit station with 220 MWe Pressurized Heavy Water Reactors. Refueling of these reactors is done when reactor is on-power. The spent fuel bundles discharged from the reactor are transferred to spent fuel storage bay (SFSB) through the Spent Fuel Transfer Duct (SFTD). The duct is normally covered with thick hatch blocks to provide adequate shielding. As the radiation fields in the SFTD area can be high during spent fuel bundle transfer, shielding blocks are provided in the area and personnel entry to this area is not allowed when the shielding blocks are removed.

On May 30, 2011, Unit-2 of KAPS was operating at 98% FP. A painting job was planned in SFTD area. Formal permission called radiological work permit was issued for the painting job after taking clearance from engineer-in-charge of refueling operations. This permit was issued to carry out painting work between 09.15 hrs and 13.00 hrs in the SFTD area. No spent fuel bundle was being transferred when the painting work started. However, at around 12.00 hrs, refueling operator in the control room inadvertently discharged spent fuel bundles to SFSB through SFTD after refueling. On hearing noise from the SFTD, workers in the area got alerted and they rushed out of the SFTD area. However, four workers who were carrying out the job got exposed to radiation and received 90.72 mSv, 66.81 mSv & 58.70 mSv, and 23.23 mSv radiation dose. The radiation doses to the workers were higher than the prescribed annual regulatory limits stipulated by Atomic Energy Regulatory Board (AERB). Due to this, the event has been rated at level-2 on INES.

AERB deputed two of its officers to investigate the circumstances leading to the incident, radiological safety aspects and other relevant factors. During Safety reviews done in AERB, it was noted that the event occurred due to inadequate/improper planning of the housekeeping and painting work in the SFTD and failure to establish appropriate procedure for control of fuel transfer operations while the painting work was in progress.

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After investigation of the event policy changes have been made with respect to controlling the opening of the shielding hatch blocks of SFTD and a ban on refueling operations during the period when the shielding blocks are open. AERB has also asked all the NPPs to review this event and reinforce the procedural controls to obviate similar events / failures.

Even though the exposures received by the persons involved in the work exceeded the limits prescribed by AERB, the dose received were well below the levels that can cause any immediate health effects or functional impairment . Any possible health effects at the dose levels received by the persons in this incident are considered insignificant.