

Dose Evaluation to Worker from Repair Process due to Failure of Spent Resin Mixture Treatment Device

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Radiological safety evaluation was performed on workers who repaired each component of spent resin treatment device that could process 1 ton of spent resin mixture per day. According to the Nuclear Safety Act in South Korea, the disposal of intermediate-level radioactive waste (ILW) in caves is not approved. To solve this, a spent resin treatment device, which separates the resin containing ¹⁴C from zeolite & activated carbon and desorbs the ¹⁴C through a microwave device, is being developed.

For each spent resin treatment device with a spent resin mixture treatment capacity of 1 ton per day, radiological safety evaluations were performed for workers while each component was repaired. When each component was designed to be repairable from the outside, the worker received only external dose, and it was derived 17.6 days (4.82 % of 1 year) as an average value. However, if it is necessary to check the inside of the malfunctioning device, the worker receives an internal exposure of a very large value (2.72E+02 ~ 2.31E+03 mSv). During the day of repairing zeolite & activated carbon storage tank, even if the worker inhales only 0.62 % of radionuclides, the annual dose limit of 20 mSv is reached. In other words, in order to secure radiological safety while the worker repairs the device, an extra pumps and tanks are necessary to temporarily store the untreated spent resin mixture included in the devices before starting the repair.

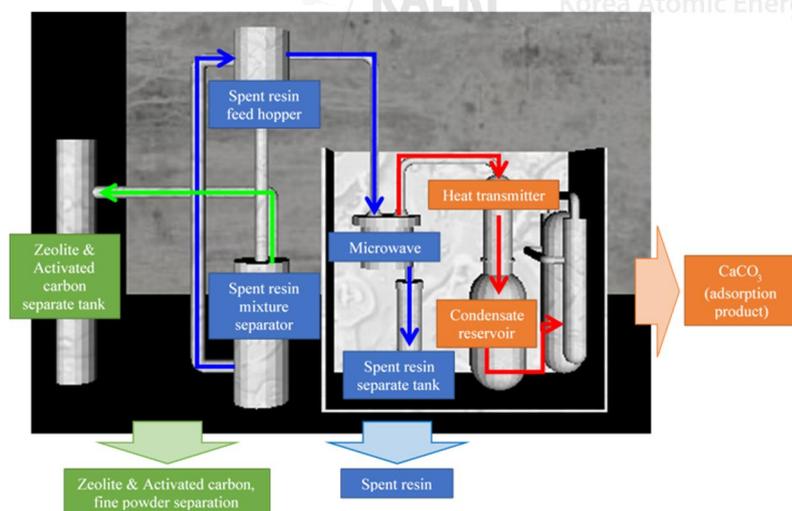


Fig. 1. Spent resin mixture treatment device process.

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