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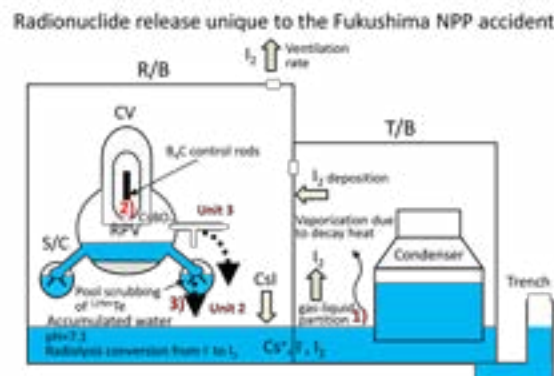
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Radionuclides release behaviors unique to the Fukushima Daiichi nuclear power plants accident

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A lot of analyses on the source terms for the Fukushima Daiichi Nuclear Power Plants accident have been tried mainly using the two methods. One is the reverse estimation using the atmospheric dispersion code combined with the environmental monitoring data. The other is the analysis of thermo-hydraulics and radionuclides release/transport using the severe accident codes such as MELCOR. Although some significant differences were found in the results between them, there are few studies with these points of view so far. Therefore, the present study focused on this point and the following findings were obtained. 1) The ^{131}I release could have occurred from a large amount of contaminated water in the basements of Units 2 and 3 reactor buildings because of the gas-liquid partition of ^{131}I and steam generation from the accumulated water by decay heat. 2) The chemical form of certain fraction of released cesium could have been CsBO_2 , which was formed by reaction of CsOH with the boron originated from the B_4C control rods. The chemical form could affect not only the cesium source term but also the environmental transport behavior. 3) The $^{129\text{m}}\text{Te}$ release estimated by the reverse calculation showed that the release amount from Unit 2 may have been smaller than those from Unit 3. This can be explained by the recent TEPCO's observation that the containment failure occurred at middle height of drywell at Unit 3 but at the bottom of suppression pool at Unit 2 where the radionuclide removal by the pool scrubbing is expected. The similar release behaviors could be also inferred for ^{131}I and ^{137}Cs . These findings have never been considered or predicted in most of the existing severe accident codes that have been developed based on the findings of the TMI-2 accident in which most of radionuclides remained in the intact containment.



Biography

Akihide Hidaka has his expertise in severe accident phenomena and nuclear human resource development. He has completed his PhD from the Tohoku University, Japan. He is Senior Principal Researcher of Japan Atomic Energy Agency. He carried out a study about radionuclide release from fuel, transport and deposition of radionuclide aerosol in the reactor coolant system or the containment, atmospheric dispersion of radionuclides at the time of nuclear power plant accidents. At present, he is performing the source term study for the Fukushima Daiichi Nuclear Power Plant accident while engaging in the atomic energy personnel training for Japanese and Asian countries' engineers.

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