

What is the most important studies to achieve the disposal of high-level radioactive waste in Japan?

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R and D for the disposal of high-level radioactive wastes have been performed from the viewpoints of geological environment, disposal technology, and safety evaluation. However, I must point out that the linkage of these viewpoints was not enough and scientific reliability for the total safety evaluation would not be achieved in tectonically active areas like Japan. Groundwater scenario of radionuclide migration is a scenario, in which groundwater flow and radionuclide migration are modelled and long-term safety is evaluated. For that, high-resolution configuration of geological structure is essential, but technical methods to accomplish it are not enough as yet. Without such information, even a sophisticated modeling and calculation of groundwater flow and radionuclide migration cannot be reliable. In addition, even if fractures were well characterized, groundwater flow along fractures has wide uncertainty. In other words, we cannot avoid uncertainties in groundwater scenario, even though direct scenario by fault movement, volcanic activity, uplift and erosion, and so on is cleared. This issue is far more important in Japan than other tectonically stable countries, because tectonic activity may influence groundwater regime in unpredictable manners. I must say this point has not been looked at straight.

First of all, we need to look for a host rock that has less numbers of fractures, which could be paths of groundwater. Then, we need to establish nondestructive prospecting methods for delineating fractures with knowing their applicability. Basic principles for siting candidate disposal sites in Japan is a step-wise procedure: If they find definite adverse conditions for the HLW disposal, they will give up the site; but if not, they proceed to the next step for detailed investigation. However, who will make a decision to give up after spending huge amounts of money? I believe candidate sites should be selected from areas that have less uncertainties as far as possible particularly in terms of fractures.

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