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## Reduction of geological disposal area by introducing partitioning technologies under conditions of high burn-up fuel and high content vitrified waste (Poster)

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The thermal properties and amount of vitrified waste are major factors that determine the eventual disposal area of high-level radioactive waste deep underground. The effect of high burn-up operation of a light-water reactor with UO<sub>2</sub> fuel on the amount and thermal properties of vitrified waste under various nuclear fuel cycle conditions was discussed. In addition, the effect of Cs and Sr separation and high-content vitrified waste on reducing the waste-occupied area, which may affect the geological disposal area, under high burn-up conditions was quantitatively evaluated by using the Comprehensive Analysis of Effects on Reduction of disposal Area (CAERA) index. The fuel burn-up had a limited effect on the amount of vitrified waste. Furthermore, the contribution to the heat generation rate of vitrified waste for high burn-up conditions of <sup>137</sup>Cs, <sup>90</sup>Sr, and their daughter nuclides, which have relatively short half-lives, increased and contribution of <sup>241</sup>Am, which has a longer half-life, decreased. Therefore, high burn-up conditions reduced the waste-occupied area via Cs and Sr separation, and the maximum effect was a reduction of 74% of the waste-occupied area with a fuel burn-up of 70 GWd/tHM, 4-year spent fuel (SF) cooling period, 90% Cs and Sr separation, and 30 wt % vitrified waste loading. The results suggested that fuel burn-up, SF cooling period, partitioning technology, and vitrified waste loading are important for the geological disposal area, and it is necessary to consider the combination of these conditions for reducing the geological disposal area.

This contribution is supported by a poster and also an oral presentation. The full paper is included in the Conference with ID#34.

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Japan

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