Errata 2011-10

SKB TR-10-23

THM-issues in repository rock

Thermal, mechanical, thermo-mechanical and hydro-mechanical evolution of the rock at the Forsmark and Laxemar sites

In the earlier distributed report, there are errors that have now been corrected. The corrected pages 48 and 174 are enclosed. The changed text is marked with a vertical line in the page margin. An updated pdf version of the report, dated 2011-10, can be found at www.skb.se/publications.

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5.2 Canister power and decay rate

The heat generation as function of time contributes to determine the thermal evolution. The power of each canister will decay at a rate that depends on the burn-up of the fuel and the interim storage time, i.e. the time between discharge of the fuel from the nuclear power plant and deposition, cf. Figure 5-1 (right). /Hökmark et al. 2009/ fitted an exponential expression to power decay data given for SKB fuel of different types, different burn-up and different interim storage times to give the normalized canister power $P(t)$, cf. Equation 5-1. This expression is used in the Site Engineering Report and throughout in this report to represent the power decay rate of the spent nuclear fuel.

$$P(t) = \sum_{i=1}^{7} a_i \exp(-t/t_i) \qquad \text{Eq. 5-1}$$

Here, t is time after deposition and t_i are time constants. The coefficients, a_i, are presented in Table 5-1. The exponential decay function is valid for 20,000 years or more /Hökmark et al. 2009/.

The normalized power, Equation 5-1, during the first 10,000 years after deposition is shown in Figure 5-1 (left). Figure 5-1 (right) shows the normalized power of fuel of different ages and different burn-up from Boiling Water Reactors (BWR) and Pressurized Water Reactors (PWR) compared with the exponential expression in Equation 5-1. The exponential relation holds sufficiently well also for the small amount of MOX fuel that will be included among the BWR fuel assemblies /Hökmark et al. 2009/.

Table 5-1. Decay-coefficients for SKB reference fuel /Hökmark et al. 2009/.

I	t_i (years)	a_i (–)
1	20	0.060147
2	50	0.705024
3	200	–0.054753
4	500	0.249767
5	2,000	0.025408
6	5,000	–0.009227
7	20,000	0.023877

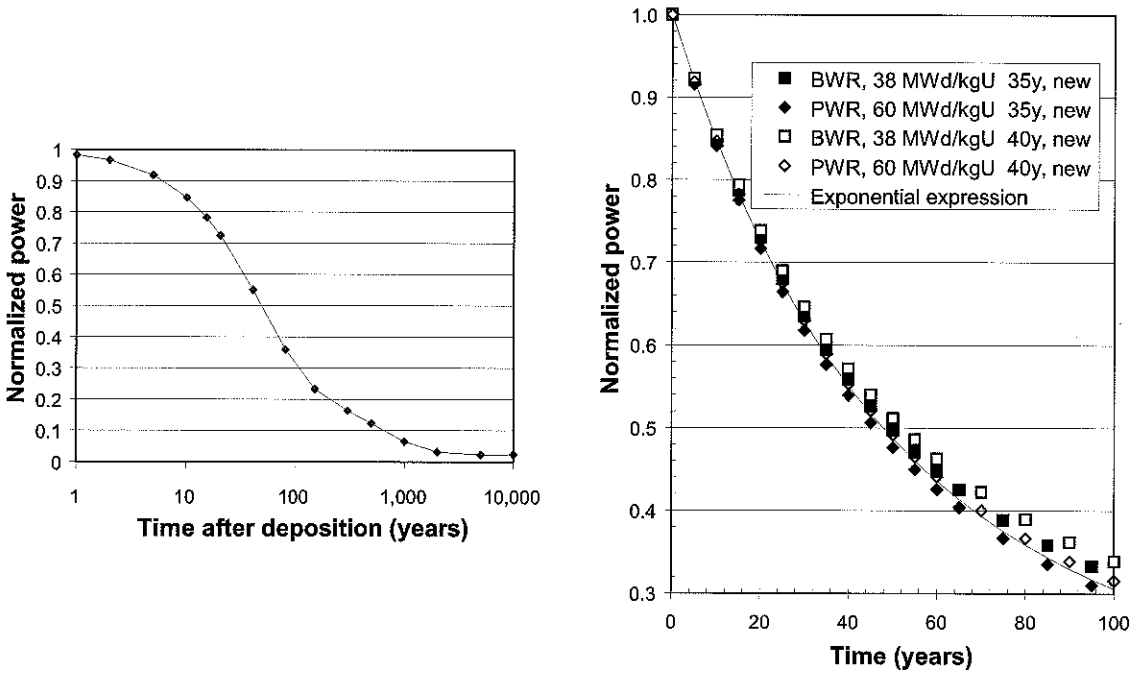

Figure 5-1. Left: Normalized power function, P(t), as function of time, cf. Equation 5-1. Right: Normalized power function compared with normalized heat power of BWR and PWR fuel of different ages and burn-up with power decay /SKBdoc 1198314/ based on radionuclide inventories given in the ***Spent fuel report.***

Unpublished documents

SKBdoc id, version	Title	Issuer, year
1198314, 1.0	Källstyrkor för bränsleelement under driftskede för Clink, slutförvars-anläggning och slutförvar	Alara Engineering, 2010