

SKB TR-11-01

Long-term safety for the final repository for spent nuclear fuel at Forsmark

Main report of the SR-Site project

Volume I

In the earlier distributed report, there are errors that have now been corrected. The corrected pages 58 and 246 are enclosed. The changed text is marked with a vertical line in the page margin. An updated pdf version of the report, dated 2012-12, can be found at www.skb.se/publications.

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1.6.2 Repository engineering

A repository engineering group has developed a reference repository concept that is practically achievable while providing the required safety functions. The reference concept includes basic dimensions of the facilities as well as reference technical solutions for buffer and backfill. Using the reference concept and based on the site description, repository engineering then developed site-adapted layouts of the final repository. During the work, feedback was given to the continued site modelling and site investigation work. For the needs of SR-Site and SKB's licence application, the reference concepts, the site adapted repository layout and the methods for achieving these are documented in a number of so called **Production reports**, as further described in Chapter 5.

1.6.3 Canister development

Within the continuation of that project, techniques for canister production and sealing are further developed and documented. The project provides input to SR-Site in terms of canister properties. For the needs of SR-Site and SKB's licence application, the reference canister and the production methods for achieving it are documented in the **Canister production report**, see further Section 5.4.

Table 7-8. Links between process tables, AMF, Figure 7-4 and reporting in in this main report. Permafrost and glacial periods. The modelling activities in the left column correspond to yellow objects in Figure 7-4.

Modelling activity in AMF	Included processes, as indexed in process tables in Section 7.4	Code	Section(s) where modelling is reported	Note	Modelling report Reference	In AMF
Permafrost modelling	F1, F2, Ge1	Numerical permafrost model	10.4.1, 10.4.3		In the Climate report, details in Hartikainen et al. 2010	In TR-10-49, details in TR-09-17
Ice sheet modelling	External processes, see SR-Site Climate report	UMISM	10.4.1		In the Climate report	In, TR-10-49, details in TR-09-19
GIA modelling: (Global Isostatic Adjustment)	External processes, see SR-Site Climate report	Numerical GIA model	10.4.1		In the Climate report, details in SKB 2008c	In, TR-10-49, details in TR-06-23
FPI calculations; calculation of the occurrence of Full Perimeter Intersecting fractures in deposition tunnels (see Section 5.2.2)	Initial state issue	Matlab	10.4.5		Munier 2010	TR-10-21
Near-field stresses (geosphere)						
Reactivation	Ge5	3DEC	10.4.4		Hökmark et al. 2010	TR-10-23
Fracturing	Ge6	3DEC	10.4.4		Hökmark et al. 2010	TR-10-23
Groundwater composition over glacial cycle	Ge7	3DEC	10.4.4		Hökmark et al. 2010	TR-10-23
Hydro, glacial domain	Ge3, Ge11, Ge12, Ge21	PhreeqC	10.4.7		Salas et al. 2010	TR-10-58
Hydro, ice location II	Ge3, Ge11	DarcyTools	10.4.6		Vidstrand et al. 2010	R-09-21
Oxygen penetration during glacial period	Ge3, Ge11	ConnectFlow	10.4.6		Selfroos and Follin 2010	R-09-22
Buffer and backfill freezing cases	Ge11, Ge15	PhreeqC, PHAST, analytical expressions	10.4.7		Joyce et al. 2010	R-09-20
THC behaviour	Bu3, BFT2	PHAST	10.4.8		Sidborn et al. 2010	TR-10-57
Corrosion calculations (including buffer erosion calculations)	Bu11, Bu12, Bu13, Bu14	PHAST	10.4.8		Birgersson et al. 2010	TR-10-40
Solubilities	Bu18, C11	Analytical expressions (Excel)	10.4.9		Sena et al. 2010	TR-10-59
Radionuclide transport, near-field	F14	"Simple functions"			SKB 2010d	TR-10-66
Radionuclide transport, far-field	F17, Bu25, BFT21 (The above three include, as sub-processes, F1, F12, F13, F14, Bu11, Bu12, BFT9, BFT10 and BFT11)	COMP23	Chapter 13		Radionuclide transport report	TR-10-50
Biosphere landscape model	Ge24, consisting of sub-processes Ge11, Ge12, Ge13 and F1. Biosphere processes	FARF31 MARFA Ecolago, MIKE_SHE, Pandora, ERICA	Chapter 13 13.2		Radionuclide transport report	TR-10-50
					Avila et al. 2010	TR-10-06