



BELBaR

BELBaR Project

Start-up Meeting

Work within BELBaR project (NRI-Rez)

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NRI is involved in these WP's

- ❑ NRI-Rez is involved in 5 WP's
- ❑ Participants from NRI:
 - Radek Červinka (WP2, WP4, WP7)
 - Jani Vejsadů (WP4)
 - Antonín Vokál (WP1)
 - Václava Havlová (WP3)
 - Katka Videnská (WP3)

NRI	WP1: Safety Assessment	WP2: Erosion	WP3: Radionuclide and host rock activity	WP4: Colloid Stability	WP5: Conceptual and mathematical models	WP6: Dissemination	WP7: Project management	TOTAL
Person months	2	10	10	7	0	0	1	30



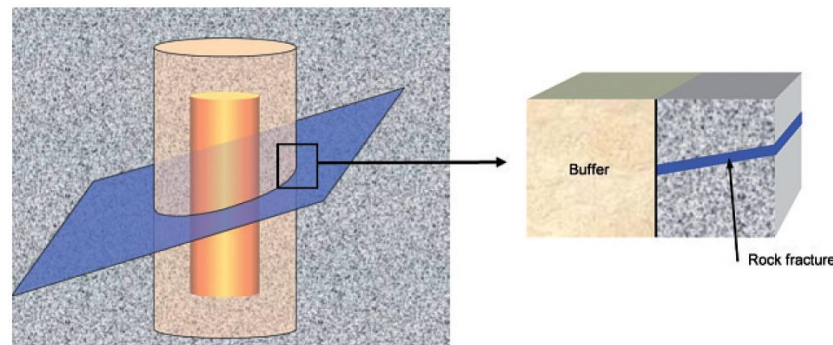
WP1 - Safety Assessment

□ Description of work:

- **NRI will focus in Task 1.1 on analysis and discussion of information available for treatment of colloids in safety cases related to DGR concept of disposal of spent fuel assemblies in carbon steel canisters surrounded by Ca-Mg bentonites from Czech deposits in a granite host rock of Bohemian massif.**
- **In task 1.2 information obtained from all WPs will be utilised for proposal of scenarios related to colloids, discussing the uncertainties related to the scenarios and proposal of recommendations of treatment of colloids related issues in future safety cases of Czech concept of DGR.**

□ Description of work:

- **NRI-Rez** will focus on bentonite erosion in granite fracture in laboratory scale during the saturation phase - size up the amount of bentonite particles eroded from the swelling bentonite by the flowing water in the fracture
- Ca/Na-bentonite Rokle, dry density 1600 kg/m³
- Variables
 - fracture aperture, flow velocity



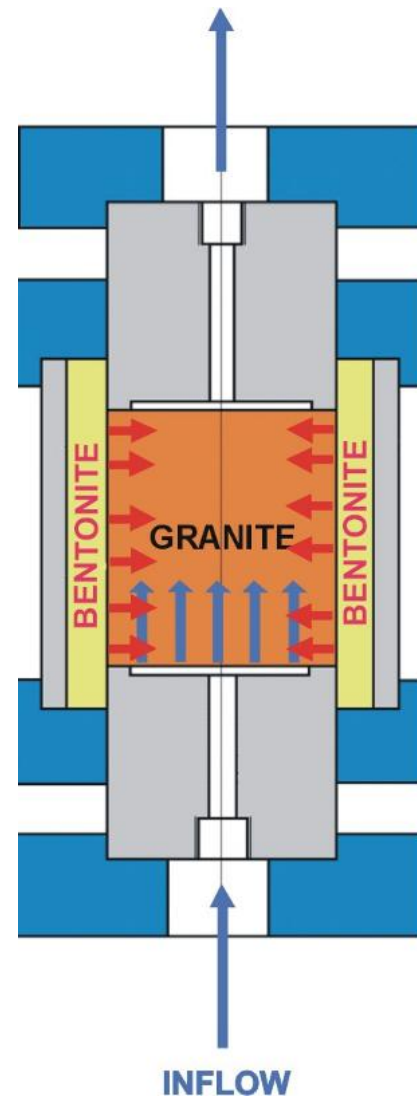
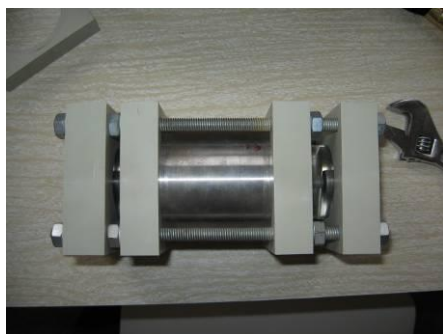
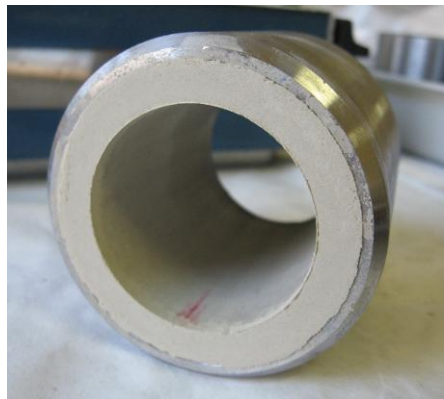
Olin et al. 2010 Clays in natural and engineered barriers for radioactive waste confinement.

□ Experimental conditions:

Partner:	Bentonite type:	Granite type:	Experimental type:	Hydrochemistry:	Measurement:
NRI-REZ	Rokle, MX-80?	Czech granite (Melechov site)	column	distilled w., SGW - synthetic groundwater?	pH, conductivity, Al conc., tot. eroded mass, DLS

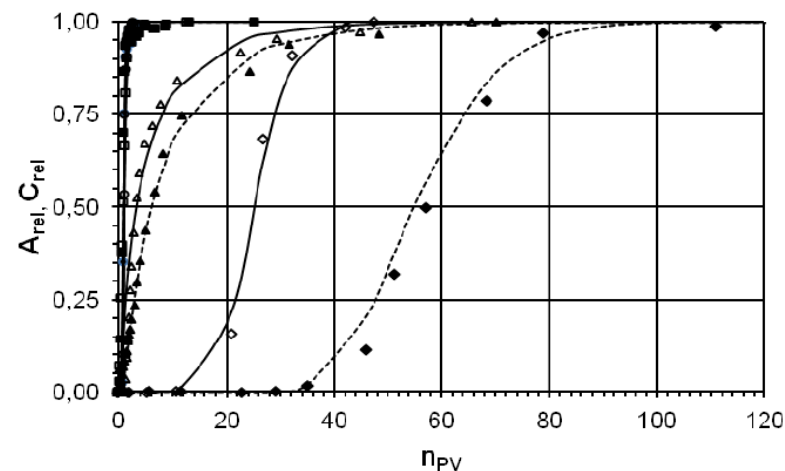


WP2 - Erosion



□ Description of work:

- **NRI-REZ** will perform a series of column migration experiments with crushed granitic material of different grain size (Czech granite from Melechov site). Use of crushed granitic fissure infill can be also considered
- Influence of bentonite colloids on radionuclide retention through rock columns under defined conditions, relevant to Czech disposal concept, will be studied (preparation of colloid suspension connected with WP4)
- Bentonite colloids will be prepared from the natural Rokle bentonite (NorthWestern Bohemia) that is considered for buffer and backfill material in the Czech disposal concept



Comparison of breakthrough curves for $^3\text{H}^+$ (○, ●), SeIV (△, ▲), SeVI (□, ■) and $^{85}\text{Sr}^{2+}$ (◇, ◆). Empty symbols – crushed granite, full symbols – granite with fissure infill, granite fraction 0,125-0,63 mm.

□ Experimental conditions:

Partner:	Bentonite type:	Granite type/competing ligand:	Radionuclide(s)	Experimental type:	Hydrochemistry:
NRI-REZ	Rokle, MX-80	crushed Czech granite (Melechov site)	^{134}Cs , ^3H , Se	column	SGW - synthetic groundwater

WP4 – Clay colloid Stability

□ Description of work:

- **NRI-Rez will focus on clay colloid stability studies:**
 - dependence on pH
 - simulation of groundwater relevant to Czech host-rock conditions or high pH cement waters)
 - dependence on ionic strength
 - simulation of groundwater relevant to Czech host-rock conditions or high saline waters
 - Purified Ca/Na-bentonite Rokle, MX-80
- Input to WP2 and WP3
- will study basic coagulation and CCC of clay dispersions
 - by inorganic cations (Na^+ , Ca^{2+} , Mg^{2+} , Al^{3+}) – kinetics (DLS)
 - organic complexing agents (e.g. humic substances)
 - Humic acids available with characterized properties (natural HA from Ruprechtov site, standards as Leonardite (IHSS), Aldrich-FLUKA) or kerogen (natural kerogen extracted from Ruprechtov site) – FUNMIG project



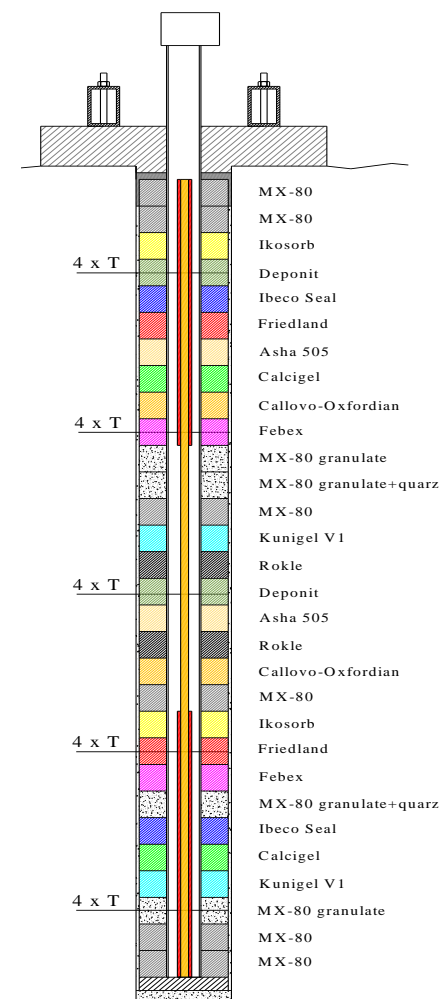
□ Available materials:

– Organic complexing agents (e.g. humic substances)

- Humic acids available with characterized properties (natural HA from Ruprechtov site, standards as Leonardite (IHSS), Aldrich-FLUKA) or kerogen (natural kerogen extracted from Ruprechtov site) – FUNMIG project

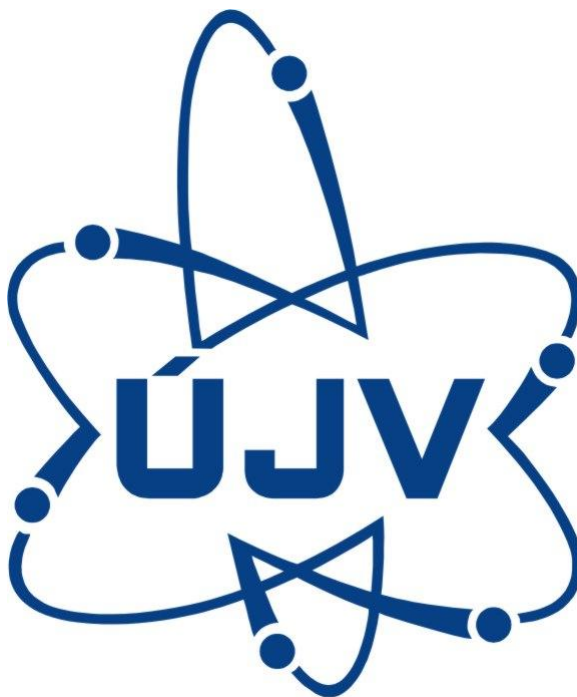
– Buffer material - Rokle bentonite

- Rokle bentonite in ABM project
 - Bentonite included into Alternative buffer material project
- Natural Ca-bentonite Rokle, also activated Na-bentonite Rokle of same origin with characterized properties





Thank you for your attention



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