ABSTRACT
Bentonite-based geomaterials are used in the designs of geological repository planning in most countries, particularly in the disposal of high-level radioactive waste. The physical integrity of the bentonite sealant is critical in ensuring its hydraulic and retention qualities, which affect the repository's long-term function. X-ray computed tomography (XCT) is used in this study to improve the textural and structural characterization of natural and man-made bentonite samples.

INTRODUCTION
The use of clay materials in geotechnical applications for geological disposal of high-level radioactive waste differs from all other environmental applications in one important way: the time period for evaluating the system's performance can be up to a million years. This necessitates a knowledge of processes that extend beyond experimental timescales. Field investigations on the deposits themselves are the sole means to understand processes over geological timescales. Clays (i.e. Bentonite) are hydrogeologically, geochemically and mechanically stable over geological time-scales, i.e., millions of years.

PROPOSED APPROACH
• The potential of XCT analysis to improve deposit scale understanding of natural bentonites and to provide a non-destructive method for comparing natural and processed bentonites is being investigated.
• Zeiss Xradia Versa Micro-CT placed at innovation accelerator building was used to investigate the structural definitions of bentonite samples.

REFERENCES

CONCLUSION
• The use of Micro-CT can help us understand the structural properties of any porous material, interlayer studies, fracture studies for materials.
• The porosity of media can be determined using XCT.
• The data from X-CT also provides information about the density and total volume occupied.
• This study can help us to understand the packing layers used around the radioactive spent fuel to avoid leak of radiation.

FUTURE WORK
To better conclude the results:
1. More samples of bentonite clay needs to be analyzed using Micro-CT
2. Software that can deal with 3D visualization should be used to determine the voids, fracture etc in this samples.
3. Wetting of samples and determine their structural properties.

Fig. 1. Examples of placement of disposal packages in a repository. Voidage is filled with bentonite, NWMO 2016. http://www.nwmo.ca/
Fig. 2. Bentonite Clay samples; a) Dry pellets of Bentonite, b) Fine powder of bentonite clay, c) 2-Layer of Bentonite clay
Fig. 3. Dry pellets of bentonite clay; a) Top-sectional view, b) 3D-top view of pellets, c) 3D-hot temperature view d) Side sectional view e), f) 3D Side view.
Fig. 4. Fine powder of bentonite clay; a) Top-sectional view, b) 3D-view of bentonite fine powders
Fig. 5. Layer of bentonite clay (Top layer-Fine powder and bottom layer pellets); a) Top-sectional view, b) Side- 2D view, c, d, e, f) 3D sectional view
Fig. 6. Fiji software to determine the mean of voids calculated. Software like Dragon Fly, Fiji. ImageJ can be used to determine the structural properties of the bentonite clay after