Continued study of the Mt Nebo Pointe highwall suggests the spectacular sand-filled cracks were not formed by injection as first hypothesized, but by chemically active fluids that flowed along joints and fractures, resulting in blocky vertical weathering along Liesegang bands.

Petrographic analysis of oriented samples showed the inter-crack sandstone and the host rock exhibit the same mineralogy, subhorizontal grain trends and grain packing. Close examination of the highwall revealed that some cracks contain horizontal muscovite-rich weathering planes concordant with bounding surfaces. Conversely, a sand injectite hypothesis would predict the mineralogy to be different of composition with clear dike-parallel grain trends, tight packing and truncation of host sedimentary structures. Only one sample showed any vertical trends, appearing to grade laterally from coarse to fine sand.

However, the mineralogy does suggest pervasive oxidative diagenesis related to fluid flow. Chlorite grains and iron oxide cement account for about 25% of the host rock respectively, while the inter-crack sandstone contains up to 25% chlorite, ubiquitous iron oxide cement and increased secondary porosity. Muscovite and biotite are important accessories in all samples, and kainite is a minor accessory. Throughout the highwall, zones within and immediate to fractures are dominated by iron-oxide cement and Liesegang bands. A sharp ‘bathtub-ring,’ seen approximately six meters from the base, may indicate the maximum saturation level.

The distribution of crack morphologies does not appear to be associated with the highwall’s excavation. Cracks in the flanks tend to fan upwards while those nearer the center are linear and subvertical, even where overburden is minimal. It seems more likely this is linked to the joints’ proximity to the surface during either their formation or oxidation.

In light of these results, the term ‘dike’ previously and tentatively used to describe these features is now considered an inaccurate genetic description.

METHODS

Petrography of oriented samples was a key component of this work. Thin sections were prepared by Calgary Rock and Materials Services Inc. and analyzed using a Nikon Eclipse 50i POL microscope. All thin sections and micrographs are vertically oriented. The trend or oxidation.

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