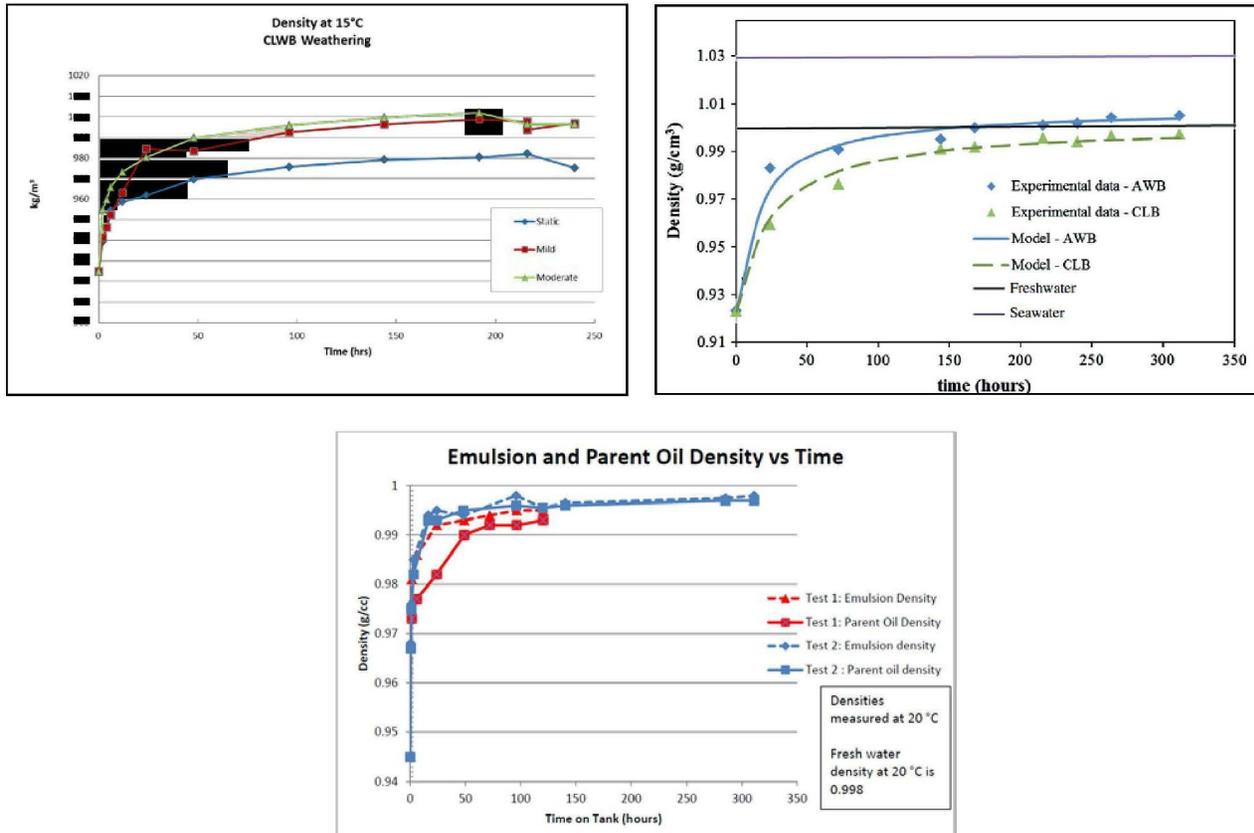


## Attachment E

### Tank and Flume Experimental Results for Changes in Weathered Oil Density



Tank (top left) and flume (top right and bottom) experiment results show natural evaporation for two of the major export dilbits (Access Western Blend – AWB) and Cold Lake Blend (CLB) in comparison to freshwater ( $1 \text{ g/cm}^3$ ) and seawater ( $1.03 \text{ g/cm}^3$ ) densities. AWB and CLB (under moderate agitation) approached freshwater density after approximately 6 days of weathering (WPW, 2013; tank tests)<sup>2</sup> (King et al 2014 and SLRoss 2012 flume tests)<sup>3,4</sup>. CLB weathered oil never exceeded fresh water density. These tests further support the case that the crude oils proposed for handling at VE terminal generally will not sink. Only some portion of very weathered and specific oil sands product may submerge or sink after days of weathering and possible oil particulate aggregation.

<sup>2</sup> Witt O'Briens; Polaris Applied Sciences; Western Canada Marine Response Corporation, A Study of Fate and Behavior of Diluted Bitumen oils on Marine waters; Dilbit Experiments – Gainford, Alberta; Transmountain Pipeline ULC: 2013; p. 163.

<sup>3</sup> King, T.L.; Robinson, B.; Boufadel, M.; and Lee, K. , 2014. Flume tank studies to elucidate the fate and behavior of diluted bitumen spilled at sea. Marine Pollution Bulletin 2014 83 (1). 32-37

<sup>4</sup> SL Ross Environmental Research Limited. Meso-scale Weathering of Cold Lake Bitumen/Condensate Blend; Ottawa, Canada, 2012 Report prepared for Enbridge Northern Gateway. Filed with the National Energy Board, February 6, 2013.