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Dear Ms. Mann,

Below are my preliminary correlations and suggestions for AK-3 drilling project through 800' (8/30/2016). Most core photos were not available for depths >~174', but a photos of zones of critical interest were taken (~610', 638-347', ~705', and selective photos from 750-800'. Overall, the subjective nature of discerning basalt, andesite and "lithic basalt" has made lithologic comparisons between the two wells very challenging, but the core photos have helped substantially.

The lahar at 757'-798' is monolithologic, with each clast having a more or less concentric alteration rind. It appears to be generally clast supported, and the matrix is very fine grained and dark. The clast size increases with depth to a nearly continuous section of andesite. My interpretation is that this is a lava flow that flowed from land into the ocean, where void spaces in the rubbly flow top were filled in by fine marine sediment. In this scenario, the tuff identified midway through this unit would be a near-vertical zone of fine-grained alteration between adjacent andesite blocks. This consistent with greater depth in the well, with the general texture of the deeper rocks in the core (slightly darker, more "swirly" alteration bands), and it explains the monolithologic nature of the deposit and the alteration halos around each andesite clast, especially near the top of the flow. If this hypothesis is accurate, the andesite at ~798' is likely a continuation of this deposit. Submarine emplacement is not obvious in the TG-2 core, but it was observed in the TG-4 core at slightly greater depths. In the TG-4 core, the matrix is a fine limey mud rich in tiny basaltic shards. The limey matrix reacts slightly / moderately to HCl (easiest to see in thin section) and this could be used to test this hypothesis. Another test would be to identify marine fossils in the core as seen in TG-4.

The "submarine lava flow"/lahar could be related to similar alteration textures observed in TG-2 beginning at ~730'. The actual rock type is not the same, however, as the flow in TG-2 has larger and more abundant plagioclase phenocrysts than the andesite in AK-3. Still, if this signifies a marine transition in both wells, this places the lithologies in AK-3 ~25' deeper than those in TG-2, suggesting normal faulting along fault planes between the two wells. This correlation is tenuous, however, and should be interpreted with a grain of salt.

Correlations of fractures and other structures is even less compelling than lithologic comparisons between the two wells. However, if the stratigraphic correlations suggested here are accurate, the well is already well past the high temperature flow zone encountered in we TG-2 (this zone would have been encountered ~620' deep, in the region of rapid lithology changes or mass wasting deposit from ~600-670' in AK-3). Because the AK-3 hole did not encounter that zone, it may be restricted to the footwall of the fault, and we may encounter it deeper. That said, the well is currently in the deeper portions of the window predicted to hold the mapped fault, and this structure may be encountered in the next 150'.