



**X-ray Diffraction Report Concerning 6 Samples
Filed on December 9, 2014 to Jason McClaughry - DOGAMI**

XRD Results : Summary. All the samples were actually x-rayed three times; first from 6° to 70° and then 2° to 40° 2-theta (θ) angle. That was done because the first routine scan demonstrated many of the samples had a reflection near 6°; thus indicating a layered silicate mineral with a 14Å d-spacing. There are a number of minerals with that 14Å characteristic so another test is demanded and that is to treat your original sample mount with ethylene glycol (antifreeze) and then x-ray from 2° to 40° once again. If the 14Å peak shifts to ~17Å then montmorillonite (smectite group mineral) is indicated; if the 14Å remains pretty much stationary, then vermiculite or chlorite is indicated, given your location and the rock environment I'd be betting almost exclusively on vermiculite.

Data Summary

Sample 82 C-2 DFWJ 2014: montmorillonite, tridymite, + much amorphous limonitic material given the sample coloring.

Sample 82 C-3 DFWJ 2014: plagioclase, vermiculite, + much amorphous limonitic material given the sample coloring.

Sample 171a DFWJ 2014: quartz, montmorillonite, + much amorphous limonitic material given the sample coloring.

Sample 171b DFWJ 2014: monmorillonite, tridymite, + much amorphous limonitic material given the sample coloring.

Sample 172 DFWJ 2014: montmorillonite, tridymite, + much amorphous limonitic material given the sample coloring.

Sample 175 DFWJ 2014: montmorillonite, tridymite, stilbite, + much amorphous limonitic material given the sample coloring.

I would assume, Jason, that the tridymite was originally present as a vesicle filling, probably the quartz, too, and certainly the zeolite mineral stilbite. The only really new mineral that formed as part of the soil would be the montmorillonite as you would likely guess. As you can see from the attached diffractograms you can see quite the quite significant amorphous hump between 20 and 40 to 45° 2θ angle.

Respectfully Submitted,

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