

Dec 09, 2009

**Mr. Don Elsenheimer**  
**Minnesota Dept. Of Natural Resources**  
500 Lafayette Rd  
St. Paul, Minnesota  
55155-4045 USA

e-mail: donald.elsenheimer@dnr.state.mn.us

Dear Mr. Elsenheimer:

Re: Gold Grains in Till and Sand/Gravel Samples BFT-41, 42, 31 to 33, 21, 11 and 12, Minnesota

Attached please find our laboratory data, minus the final HMC weights which are pending, for the above eight samples which are the first samples completed from your 57-sample project.

Most of the processed samples are of till. These samples, as well as those that we are presently processing, are unusual in the following respects:

1. Their matrix tends to have a high silt/clay rather than sand content yet the clasts are mainly of crystalline Archean granitic and volcanic rocks which would normally yield major sand and negligible clay when glaciated.
2. The matrix content is very high and the clast content very low for till having this clast composition.
3. The gold content is very high, ranging up to ~200 grains per sample which implies proximity to a gold source. However, essentially all of the gold grains are reshaped whereas source-proximal gold grains are normally pristine to modified because reshaping requires long transport. Distal dispersal also normally reduces the number of grains to low background levels through dilution.
4. The average size of the gold grains is larger than normal, with most being 50 to 75 microns wide (the size of coarse silt and very fine sand) rather than the usual 25 microns (fine silt).
5. Some grains occur as flat discs with raised "doughnut" rims, a morphology more compatible with beach gold than till gold.

Together the above features suggest that the gold grains were initially concentrated in fine silty sand, possibly in the littoral zone of Glacial Lake Agassiz, and that these gold-rich sediments were subsequently overridden by and recycled into re-advancing ice, then re-deposited as silt and gold-rich, clast-poor till.

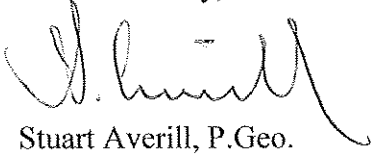
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Mr. Elsenheimer.

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I hope these observations and interpretations are helpful. Please call me if you have any questions.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Stuart Averill". The signature is fluid and cursive, with a prominent initial "S" and a long, sweeping tail.

Stuart Averill, P.Ge.  
President