Geometric Patterning of High grade ~0.3 oz/ton gold quartz veins associated with rare, Pogo-style, bismuth telluride mineral assemblages on CLY gold + Sapphire prospect, south of Nelson, B.C. Canada. Multiple crossing veins include a common line, the Tension Vein Array axis (W. Laing 2004), forming a partly mined ore chute and ore shoot Targets

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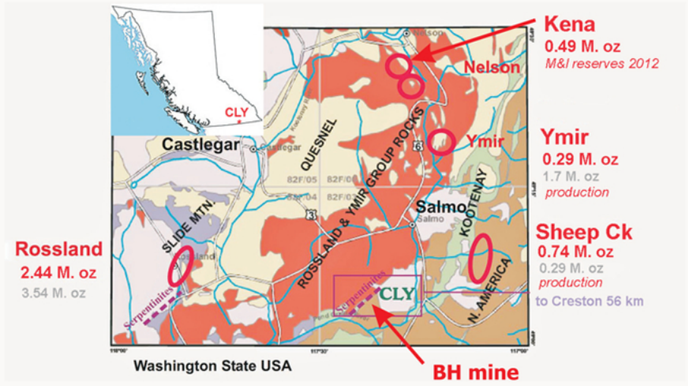
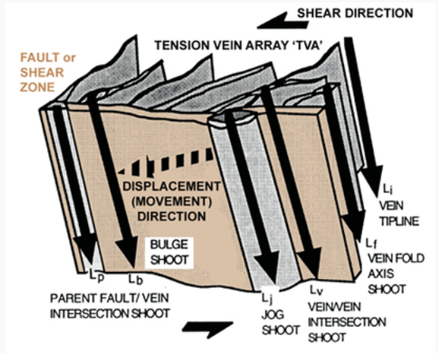
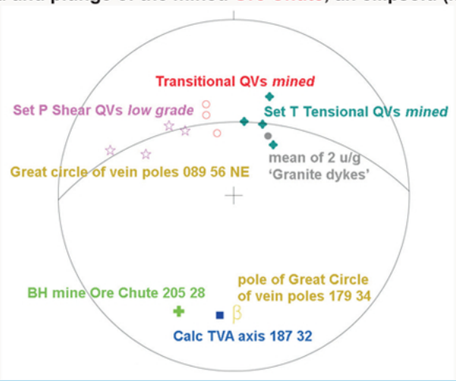


Problem: For drilling, resolve the local-scale geometry of high-grade mined ore chutes in crossing veins at the historic Bunker Hill mine MINFILE 082FSW002. Veins have rare Gold-associated Bismuth Telluride GBT minerals: 9 of 13 GBT in the 6.5 M. oz Liese Zone Pogo deposit in AK, including ingodite Bi2(TeS) & ikunolite Bi4S3, both first finds in Canada (Howard 2007), and unnamed BiTe2.

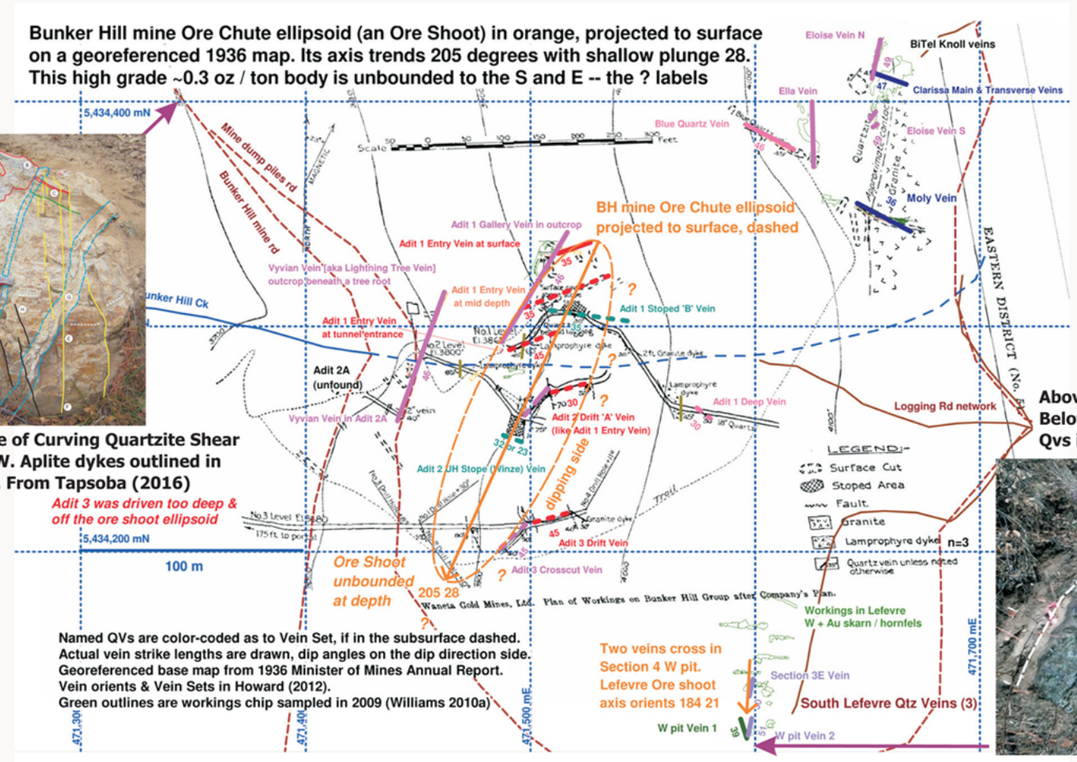
Key observation: The mined ~0.3 oz/ton tensional and transitional, & sub-economic shear veins, are ALL CO-LINEAR. What does this infer about their formation?



Above, elements of a Tension Vein Array before any rotation by progressive strain, after Laing (2004). Named Linears are all parallel. Below, at the BH mine poles to vein orients & 'granite' dykes closely follow a Great Circle. Its pole is near the Calculated TVA axis and the trend and plunge of the mined Ore Chute, an ellipsoid (map)

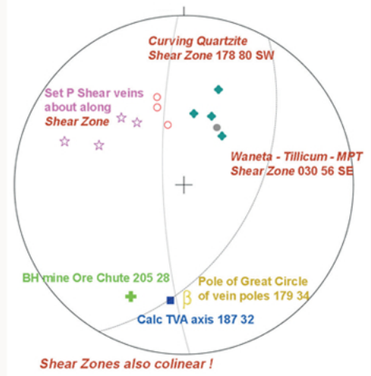


Bunker Hill mine Ore Chute ellipsoid (an Ore Shoot) in orange, projected to surface on a georeferenced 1936 map. Its axis trends 205 degrees with shallow plunge 28. This high grade ~0.3 oz / ton body is unbounded to the S and E -- the ? labels



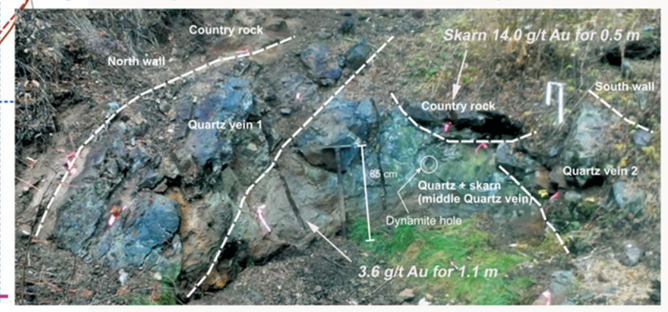
Named QVs are color-coded as to Vein Set, if in the subsurface dashed.
Actual vein strike lengths are drawn, dip angles on the dip direction side.
Georeferenced base map from 1936 Minister of Mines Annual Report.
Vein orients & Vein Sets in Howard (2012).
Green outlines are workings chip sampled in 2009 (Williams 2010a)

Single exposure of Curving Quartzite Shear Zone 178 80 SW. Aplite dykes outlined in blue, view to E. From Tapsoba (2016)



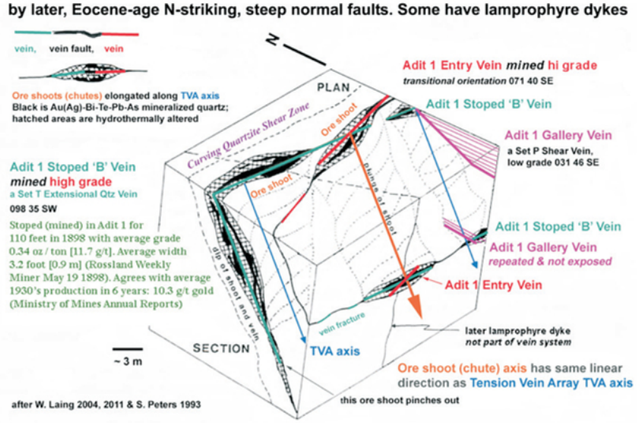
Shear Zones also colinear !

Above, crustal-scale and subsidiary Shear Zones include the TVA axis. Below, Target 2 Lefevre workings: three crossing Au-Ag-Bi-Te-As-W Qvs in the W pit of Section 4. Middle vein is mixed qtz + skarn, view E



Drill vertically anywhere in Ore Shoot Ellipse to intersect two crossing ~0.3 oz/ton veins

Perspective block diagram of the crossing Adit 1 Stoped 'B' and Adit 1 Entry Veins, the upper part of the historic Bunker Hill mine ore shoot. Expect other parallel ones, elongate & pancake-shaped. Their long axes are arrowed. Shown vein strikes are correct, but the veins dip less steeply, ~32 degrees. Several ore shoots occur, e.g. **Target 2** in the W pit of the Lefevre gold + tungsten skarn. Expect small offsets by later, Eocene-age N-striking, steep normal faults. Some have lamprophyre dykes



Target 1 of 7 Pancake-shaped Bunker Hill mine ore shoot ~0.3 oz/ton gold. Veins cross at the surface. Mined Adit 1 ore shoot is "between 2 and 6 feet wide, the average a little better than 3" (Rossland Weekly Miner May 19 1898). The ore shoots bulge and thin; more occur downhill as gold-bearing quartz veins are little exposed (Minister of Mines 1934). Below, a scaled 3D perspective view matching the block diagram to left

to trench & drill:

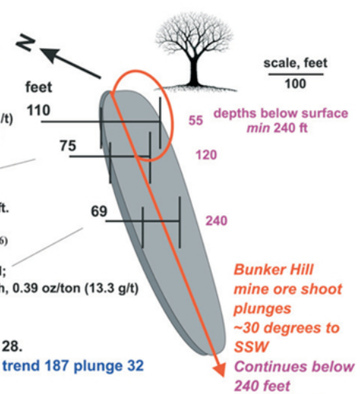
At surface the Adit 1 Gallery Vein - Adit 1 Entry Vein intersection is not exposed; one value 6.8 g/t

Mined Adit 1 Stoped 'B' Vein for 110 ft (~33.5 m), average width 3.2 ft, mean grade ~0.34 oz/ton (11.7 g /t) (Rossland Weekly Miner May 19 1898, British Colonist May 20 1899 & Annual Report Minister of Mines 1934)

Mined Adit 2 UH Stope Winze Vein for 18 ft (5.5 m), average width 5 ft; mean grade 0.31 oz/ton (10.7 g/t). Past that, 50 ft averaged 0.37 oz/ton (12.7 g/t) over 4 ft. Total length mined 75 ft (~23 m), then faulted (Langley Report 1936, Annual Report Minister of Mines 1934 & 1936)

Sampled Adit 3 Drift Vein for 69 ft (21 m), then faulted; Mean of 12 samples, over average 5 feet (1.5 m) width, 0.39 oz/ton (13.3 g/t) (Langley Report 1936 & Annual Report Minister of Mines1936)

Mined ore chute axis orients trend 205 plunge 28.
Same as system-wide Tension Vein Array axis trend 187 plunge 32



Advantages of TVA method:
*Geometrically simple
*Considers "older & younger veins in a spectrum of progressive deformation" (Laing 2004)
*Structural stages D1 D2 etc. not relevant - but still imp't!
*TVA can be ld'd in loose vein pieces, as a scalar
*Works under low to ultra-high strain conditions (qtz pipes or rods displaced to align along the movement direction)
*Allows ID of a 'covert' parent Shear Zone or fault that contains the TVA axis
*A predictive tool for orebody location & geometry

References
Howard, W.R., 2007. Structural setting and geochemical correlations in bismuth (sulfo) telluride-native gold-bearing veins, CLY Group, British Columbia, Canada: A reduced intrusion-related gold system. Geological Survey of Finland Guide 53 http://tupa.gtk.fi/julkaisu/opas/op 053.pdf
Laing, W.P., 2004. Tension Vein arrays in progressive strain: complex but predictable architecture, and major hosts of ore deposits. Journal of Structural Geology 26 p. 1303-1305.
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CLY prospect is available for option