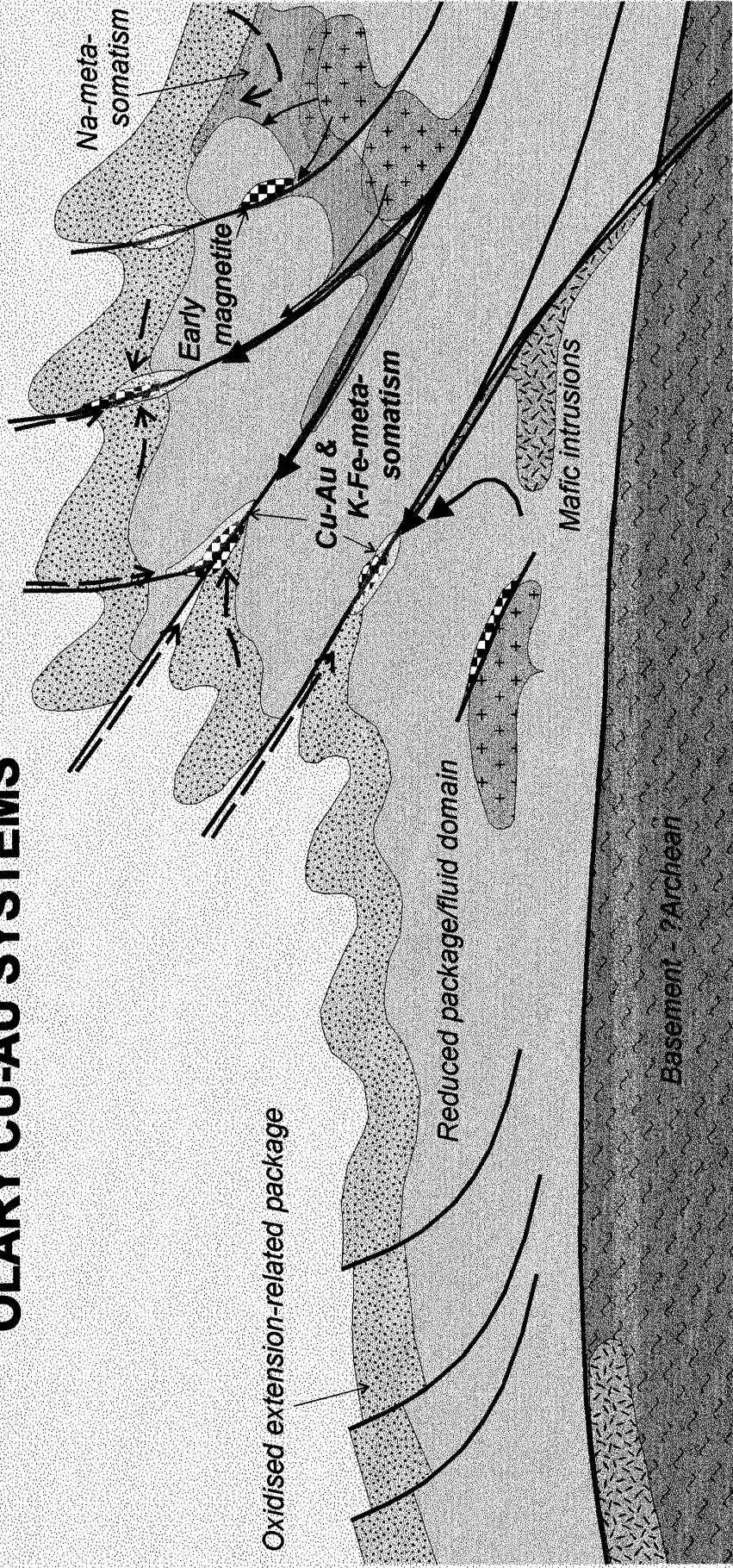


Model 36c Iron oxide-hosted Cu-Au-Fe	
Alternative Model Name	Cu-Au-Fe±Bi mineralisation in ironstones (Tennant Creek)
Commodities	Major Au, Cu; Minor to significant Ag, Bi, Co, Mo
% Global Production	Small for Au, Cu; Tennant Creek was world's major Bi producer
% Australian Production	Significant - Tennant Creek production: >125 t Au (sixth largest goldfield in Australia)
World Class Deposit Size	166 Mt @ 1.1 % Cu, 0.54 g/t Au, 0.06% Co (Ernest Henry)
World Class Deposit Examples	Ernest Henry
Geological Setting	Proterozoic ensialic basins
Age	Palaeoproterozoic and Mesoproterozoic
Components:	
<i>Source</i>	Not certain. A number of sources possible. For fluids: basinal brines, greenschist to amphibolite facies metamorphic fluid, magmatic. For metals: rift-fill sediments, I-type oxidised granitoids. In some areas subsurface mafic rocks. For energy: deformation and metamorphic processes, granitoid magmatism
<i>Transport/Pathway</i>	Transpressional shears, faults (first-order to lower order) for deep fluids; permeable metasedimentary units and faults for local fluids. Zones of regional Fe-Mg-Na-K metasomatism indicate fluid pathways
<i>Trap</i>	Structural: Syn-deformational, brittle/ductile structures(faults, shears, breccia zones). In Tennant Creek, porphyry dykes as 'seals'. Chemical: Ferruginous sediments for iron oxide metasomatism; Ironstones and carbonaceous (meta)sediments for mineralisation.
<i>Other</i>	
Critical Elements	<ul style="list-style-type: none"> • Compressional deformation orogens following extension (1) • Metasedimentary host sequences deposited in extensional settings; commonly Fe-rich and with varied redox (1) • Redox interfaces, e.g. pre-existing sulphides/oxides (especially magnetite-ironstones), carbonaceous intervals, connate/groundwater reservoirs (1) • Felsic and probably mafic magmatism overlapping temporally with mineralisation (1) • Generally metaluminous, oxidised, fractionated, dioritic to leucogranitic magmatism following earlier magmatic cycles (1-2?) • Syn-deformational, brittle/ductile settings (1) • Metamorphic (low to medium grade) host successions (2)
Other Comments	
Key References	<p>Davidson, G. J., & Large, R. R. 1998. Proterozoic copper-gold deposits. AGSO Journal of Australian Geology & Geophysics, 17 (4), 105-113.</p> <p>Wedekind, M.R., Large, R.R. & Williams, B.T., 1989. Controls on high-grade gold mineralisation at Tennant Creek, Northern Territory. Economic Geology Mongraph, 6, 168-179.</p> <p>Williams, P.J.,1998. Metalliferous economic geology of the Mt Isa Eastern Succession, Queensland. Australian Journal of Earth Sciences, 45, 329-341.</p>

TENNANT CREEK - CLONCURRY OLARY CU-AU SYSTEMS



→ Fluids (intermediate redox) sourced mainly from felsic magmas

→ Fluids (reduced to intermediate redox) reacted with reduced package and/or mafic/ultramafic rocks

--- → Oxidised basinal/connate brines and/or meteoric waters

