25B	Epithermal Au-Ag
Mineral Deposit Models (Cox & Singer model number or other)	Low sulphidation (adularia-sericite type) deposits (LS) (25A, 25B, 25C. 25D) High sulphidation (acid-sulphate type) deposits (HS) (25E)*
Commodities	Au, Ag (± Cu*)
% Global Production	<15%; major source of Au in the US which is No.2 in world terms
% Australian Production	<2% from small Palaeozoic deposits (e.g. Vera-Nancy, Wirralie, Temora*, etc) with good grade but low tonnage
World Class Deposit Size	>3 Moz
World Class Deposit Examples	Round Mountain (Nevada); McLaughlin (California); Hishikari (Japan); Ladolam (PNG); Goldfield (Nevada)*; Summitville (Colorado)*
Geological Setting	Spatial and temporal association with intermediate to felsic sub-aerial volcanic rocks and sub-volcanic intrusions. Convergent plate margins (Oceanic Arc, Back Arc) are a favoured setting with deposits forming at shallow crustal levels.
Age	Best deposits generally <25 Ma, but can be older.
Components:	
Source	LS - host rocks, associated magmas? HS* - magmas involved, likely source of S and metals
Transport/Pathway	LS - low salinity (<13 wt% NaCl eq.) dominantly meteoric ± magmatic fluid HS* - low-mod. salinity (<24 wt% NaCl eq.), magmatic fluid involved. Fluids in both systems focussed along faults and fractures.
Trap	Deposition in response to physico-chemical changes in faults and fracture zones closely related to volcanic or intrusive centres.
Other	Deposits occur in a near surface environment <2 km depth. HS deposits may be telescoped with porphyry Cu-Au – sulphides more abundant than LS deposits and include enargite, covellite. LS & HS deposits are distinguished by their alteration & sulphide mineralogy
Critical Elements	• Felsic to intermediate magmatic activity, particularly on the margins of calderas (1) • Fault and fracture zones that channel fluids – good plumbing system. (1) • Level of erosion is a critical factor in preserving deposits. (1) • Young deposits are more likely to be preserved. (2) • HS deposits may have an areally extensive, highly visible alteration zone. LS deposits typically more subdued alteration. (3)
Other Comments	Epithermals are very well characterised at the deposit scale.
Key References	Berger, B.R. & Bethke, P.M., (editors) 1985. Geology and geochemistry of Epithermal Systems, Reviews in Economic Geology Vol. 2, Society of Economic Geologists, Texas. Buchanan, L. J., 1981, Precious metal deposits associated with volcanic environments in the southwest, Arizona Geol. Soc. Digest, v. 14, 237-261. Heald, P., Foley, N.K. & Hayba, D.O., 1987. Comparative anatomy of volcanic-hosted epithermal deposits: Acid-sulfate and adularia-sericite types. Economic Geology, 82, 1-26. Sillitoe, R.H., 1993. Epithermal models: Genetic types, geometrical controls and shallow features. In: Kirkham, R.V., Sinclair, W.D., Thorpe, R.I. & Duke, J.M. (editors), Mineral Deposit Modelling, Geological Association of Canada, Special Paper 40, 403-417. White, N.C., Leake, M.J., McCaughey, S.N. & Parris, B.W., 1995. Epithermal gold deposits of the southwest Pacific. Journal of Geochemical Exploration, 54, 87-136.

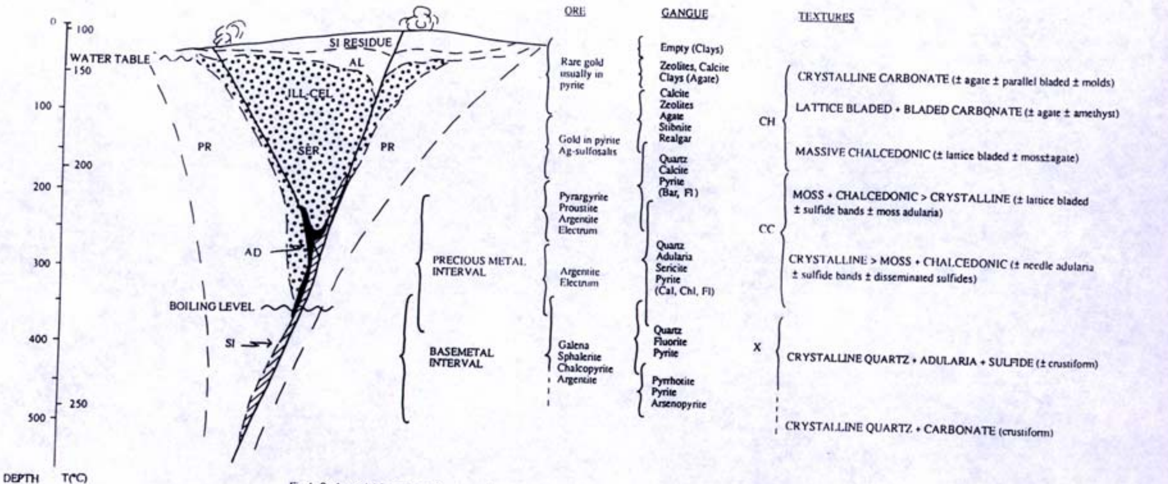

Fig. 1: Scale model for zoning of textures, alteration, ore and gangue mineralogy in a typical boiling zone epithermal vein. Based on the model of Buchanan (1981) with temperature reflecting the level for boiling under hydrostatic conditions of a fluid containing 2.84% NaCl. Alteration zones PR = propylitic; SI = Silica; AD = Adularia; ILL = Illite; SER = Sericite; CEL = Celadonite; AL = Alunite-kaolinite pyrite. See Buchanan (1981) for details. Capital letters in texture column refer to super zones: CH = Chalcedonic; CC = Crustiform-Colloform; X = Crystalline.