

## DESCRIPTIVE MODEL OF UNCONFORMITY U-Au

By Richard I. Grauch and Dan L. Mosier

APPROXIMATE SYNONYM Veinlike type U (Dahlkamp and Adams, 1981).

DESCRIPTION Uranium mineralization occurs as fracture- and breccia-filling in metapelites, metapsammities and quartz arenites located below, above, or across an unconformity separating Early and Middle Proterozoic rocks.

GENERAL REFERENCE Nash and others (1981).

### GEOLOGICAL ENVIRONMENT

Rock Types Regionally metamorphosed carbonaceous pelites, psammities, carbonate rocks. Younger unmetamorphosed quartz arenites.

Textures Metamorphic foliation and later brecciation.

Age Range In rocks of Early and Middle Proterozoic age (1,800-1,200 m.y.), affected by Proterozoic regional metamorphism.

Depositional Environment Host rocks are sedimentary shelf deposits and overlying continental sandstone. Deposits result from complex processes including regional metamorphism, weathering and supergene enrichment related to Proterozoic unconformity, and later remobilization and enrichment beneath cover of younger strata.

Tectonic Setting(s) Intracratonic sedimentary basins on the flanks of Archean domes. Tectonically stable since Middle Proterozoic.

Associated Deposit Types Gold- and nickel-rich uranium deposits may occur but are poorly understood and no models are available.

### DEPOSIT DESCRIPTION

Mineralogy Pitchblende + uraninite ± coffinite ± pyrite ± chalcocopyrite ± galena ± sphalerite ± arsenopyrite ± niccolite. Chlorite + quartz + calcite + dolomite + hematite + siderite + sericite. Locally late quartz-chlorite veins contain native gold or silver, uraninite, galena, and tellurides of Bi, Ni, Pb and Pd. Latest quartz-calcite veins contain pyrite, chalcocopyrite, and bituminous matter.

Texture/Structure Breccia filling, veins, and disseminations. Coarse euhedral uraninite and fine colloform pitchblende. Latest quartz-calcite veins show open-space fillings, colloform texture.

Alteration Multistage chloritization is dominant. Local sericitization, dolomitization, hematitization, kaolinitization. Incipient and vuggy vein-type silicification occur throughout the alteration envelope. Alteration envelope is variably enriched in Mg, P, REE, and a variety of metals. Alkali elements are depleted.

Ore Controls Fracture porosity controlled ore distribution in the metamorphites and to a limited extent in the overlying quartz arenite. The unconformity acted as a major disruption in the flow of ore-forming fluids but did not necessarily act as a locus of ore formation.

Weathering Secondary U minerals uranyl-phosphate, metatorbernite, autunite, uranophane, gummite, sklodowskite.

Geochemical and Geophysical Signature Increase in U, Mg, P and locally in Ni, Cu, Pb, Zn, Co, As; decrease in SiO<sub>2</sub>. Locally Au, associated with Ag, Te, Ni, Pd, Re, Mo, Hg, REE, Y and Rb. Anomalous radioactivity. Graphitic schists in some deposits are strong electromagnetic conductors.

### EXAMPLES

Rabbit Lake, CNSK (Hoeve and Sibbald, 1978)  
Cluff Lake, CNSK (Laine, 1985)

Key Lake, CNSK (Dahlkamp, 1978)  
 Jabiluka, AUNT (Binns and others, 1980, Grauch, 1984)  
 Ranger, AUNT (Eupene, 1979)

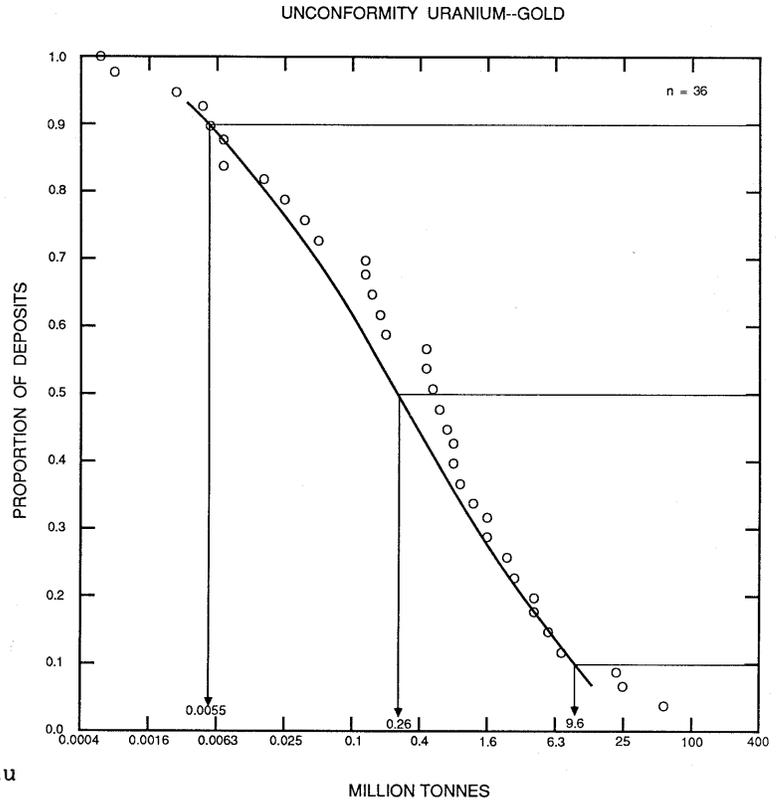
**GRADE AND TONNAGE MODEL OF UNCONFORMITY U-Au**

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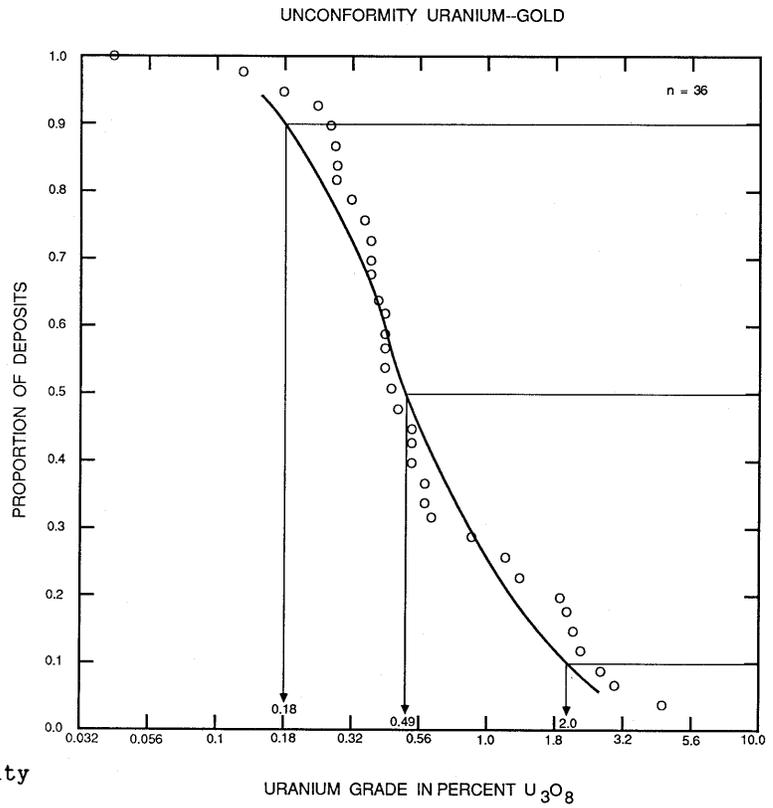
COMMENTS Deposits are defined by a separation of 100 m stratigraphically and along strike. Sufficient number of Au grades were not available to construct a plot. See figs. 187, 188.

DEPOSITS

<u>Name</u>	<u>Country</u>	<u>Name</u>	<u>Country</u>
Cluff Lake-Claude	CNSK	McClellan Lake	CNSK
Cluff Lake D	CNSK	Maurice Bay	CNSK
Cluff Lake N	CNSK	Midwest Lake	CNSK
Cluff Lake OP	CNSK	Mount Burton (Rum Jungle)	AUNT
Cluff Lake R	CNSK	Mount Finch (Rum Jungle)	AUNT
Cluff Bay A	CNSK	Nabarlek	AUNT
Cluff Bay B	CNSK	Palette	AUNT
Dawn Lake	CNSK	Rabbit Lake	CNSK
Dyson's (Rum Jungle)	AUNT	Ranger No. 1	AUNT
El Sherana	AUNT	Ranger No. 3	AUNT
El Sherana West	AUNT	Rockhole-Teages	AUNT
Fond-du-Lac	CNON	Rum Jungle Creek South	AUNT
Jabiluka I	AUNT	Scinto 5	AUNT
Jabiluka II	AUNT	Skull	AUNT
Key Lake (Deilmann)	CNSK	Sleisbeck	AUNT
Key Lake (Gaertner)	CNSK	Stewart Island	CNSK
Koolpin Creek	AUNT	West Bear	CNSK
Koongarra	AUNT	White's (Rum Jungle)	AUNT



**Figure 187.** Tonnes of unconformity U-Au deposits.



**Figure 188.** Uranium grades of unconformity U-Au deposits.