DESCRIPTIVE MODEL OF APPALACHIAN Zn

By Joseph A. Briskey

SYNONYMS Carbonate-hosted Zn; Mississippi Valley type.

DESCRIPTION Stratabound deposits of sphalerite and minor galena in primary and secondary voids in favorable beds or horizons in thick platform dolostone and limestone (see fig. 167).

GENERAL REFERENCE Hoagland (1976).

GEOLOGICAL ENVIRONMENT

Rock Types Dolostone and limestone.

Textures Subtidal, intratidal, and supratidal textures with high porosity are common, especially in the dolostones; limestones are commonly micritic, some with birdseye textures.

Age Range Appalachian deposits occur in rocks of Cambrian to Middle Ordovician age. Other deposits are in rocks as old as Proterozoic and as young as Triassic.

Depositional Environment Shallow-water, tidal and subtidal marine environments.

Tectonic Setting(s) Stable continental shelf.

Associated Deposit Types Stratabound carbonate-hosted deposits of barite-fluorite-sphalerite.

DEPOSIT DESCRIPTION

Mineralogy Sphalerite, with variable but subordinate pyrite and minor marcasite, and with minor barite, fluorite, gypsum, and anhydrite. Galena is usually absent or rare, but may be abundant locally.

Texture/Structure Mainly open space filling of coarse to medium crystalline sphalerite and pinkish dolomite. Sphalerite commonly displays banding. Locally, fine sphalerite in finely varved dolomite composes the breccia matrix.

Alteration Extensive finely crystalline dolostone occurs regionally and coarse crystalline dolomite is more common nearer to ore bodies. Silicification is typically closely associated with ore bodies. Extensive limestone dissolution and development of residual shale.

Ore Controls Ore occurs within dissolution collapse breccias that occur (1) throughout readily soluble limestone beds, or (2) in paleo-aquifer solution channels controlled by fractures or folds in limestone. Breccias commonly have domal cross sections above limestone aquifers that have been thinned by solution.

Weathering Zinc silicate and carbonate ores form in the zone of weathering and oxidation,

Geochemical Signature Readily detectable zinc anomalies in residual soils and in stream sediments. Primary zinc haloes in carbonate rocks near ore are not large enough to assist in exploration. Background in carbonate rocks: Zn = 20 ppm; Pb = 9 ppm.

EXAMPLES

Mascot-Jefferson City district, USTN	(Crawford and Hoagland, 1968; McCormick and others, 1971; Fulweiler and McDougal, 1971)
Copper Ridge district, USTN	(Hill and others, 1971)

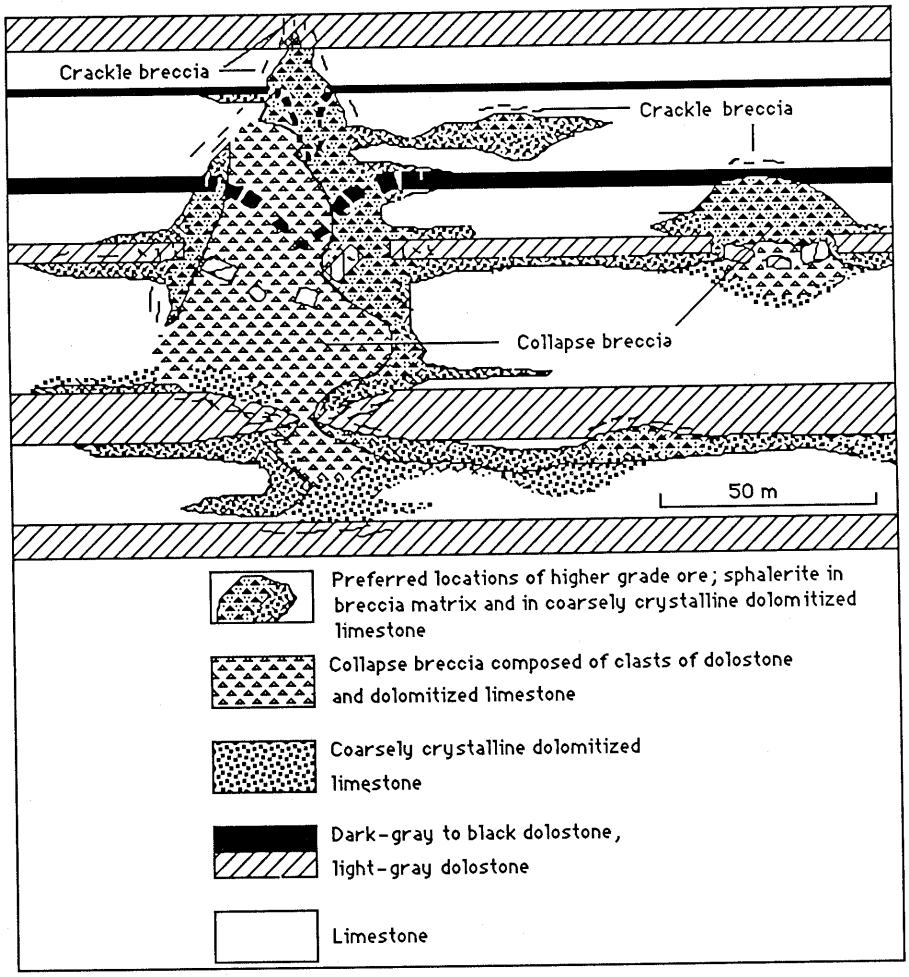

Figure 167. Cartoon cross section showing relationship of zinc ore to collapse breccia and dolomitized limestone in the Mascott-Jefferson City district, Tennessee. Modified from Armstrong and Lawrence (1983).