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Many British Columbia epithermal occurrences closely resemble the so-called 'Tertiary-type, or bonanza deposits', or fossil hot spring deposits of the southwestern United States and elsewhere. They are generally small, high-grade vein or breccia-related deposits formed in subaerial volcanic terranes and regions with subvolcanic plutons. Two 'classic' examples of different ages exhibit characteristic epithermal features: Toodoggone camp (Early Jurassic) and Blackdome Mine (Eocene). In the Toodoggone area deposits occur along the central axis of a 100km long by 20km wide belt of early Jurassic rocks called the "Toodoggone Volcanics" composed of potassium-rich andesitic subaerial pyroclastic rocks. They form a distinctive region within the upper part of the extensive Mesozoic island arc-back arc complex of the Intermontane tectonic zone.

Regional subsidence occurred during volcanism and local grabens developed. Northwesterly trending faults with strike lengths exceeding 20 km, have been outlined in the region. On a property scale these faults have been traced more than 1.6 km.

Hydrothermal fluids passed along the major faults and were focussed where they are intersected by northeasterly trending structures. Hydrothermal alteration produced extensive propylitic zones with more restricted internal areas of clay alteration and local zones of silicification. Gold and silver are found within quartz and amethystine quartz veins, stockworks and pervasive silica replacement zones. The Lawyers^{94E066} deposits, with mineable reserves of 1,757,766 tonnes grading 6.72 grams gold/tonne and 243.1 grams silver/tonne, exemplify adularia - Sericite type deposits. The AL^{94E044} deposits exemplify quartz-alunite (acid-sulphate) type deposits. The latter are primarily barite-native gold deposits formed at higher levels under acid leaching oxidizing conditions.

Although the area is remote and was only partially accessible by road up to 1987, the Toodoggone River area is now recognized as a major new gold 'camp' in the Canadian Cordillera. We have summarized our geological knowledge in a depth zoning model that compares Toodoggone deposits with similar epithermal and hot spring deposits in the U.S.A. and elsewhere.

At the Blackdome Mine^{920 052}, 12 northeasterly trending quartz + amethystine vein systems have been identified in an area 5 kilometres in length and 2 kilometres in width. Host rocks are mainly Eocene calc-alkalic andesites and rhyolites that exhibit pervasive propylitic alteration and local replacement by epidote-chlorite and carbonate. Adjacent to quartz veins distinct alteration halos extending 1-15 metres consist of adularia-sericite. High grade gold-silver ore shoots occur along faults and are small, ranging from 12 to 70 metres along strike, up to 75 metres vertically, and 1.5 to 3.5 metres in width. Reserves in 1988 were 253,960 tonnes grading 25.37 grams gold/tonne and 82.63 grams silver/tonne.

Tension fractures and brecciation, resulting from uplift by volcanic doming, acted as fluid pathways and provided loci for vein deposition.

The identification of shear zone and fault structures and the recognition of distinctive alteration types has aided considerably in the difficult and expensive search for these epithermal deposits in British Columbia.

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