

From The Mineral Inventory Files

Serendipity and a Bit of Sleuthing at Canfield Creek

The kind of serendipity that reveals a deposit of one mineral commodity during the search for another commodity is well known in mineral exploration. Such was the case at Canfield Creek, a few kilometres south of Pugwash, Cumberland County, except that in this instance the serendipity was also combined with a bit of good sleuthing.

Scurry Rainbow Exploration drilled a hole in 1966 at Canfield Creek in search of potash along the flank of an evaporitic dome of Windsor Group marine-derived rocks within terrestrial redbeds of the late Carboniferous Cumberland Group (Fig. 1). No potash was found, but in 1980 John O'Sullivan, then with Esso Minerals Canada, analyzed chip samples from this and other oil and potash exploration drillholes from throughout the Cumberland Basin as part of a reconnaissance exploration program for base metals. To its pleasant surprise, Esso found that an 18 m interval in the drillhole contained 0.5% Cu, with visible chalcocite and malachite. Esso collared a follow-up diamond-drill hole beside the Scurry Rainbow hole and intersected an 8.4 m thick Cu-bearing zone at a depth of 74 m. An exploration program ensued and after 24 holes were drilled on the property a deposit in the order of 300 000 t of 1.2% Cu and minor Ag had been defined. The deposit is hosted by a sequence of grey, gritty sandstones between overlying and underlying redbed sandstones and mudstones. The deposit covers an area of roughly 200 m by 175 m but does not outcrop; the mineralized zone occurs at depths between 35 and 110 m.

Esso quickly recognized a strong association of mineralization with zones of carbonaceous detritus in grey, reduced units interbedded with red, oxidized units. Esso concluded that these organic-rich zones likely represent channel lag deposits within a system of meandering streams. As such, this deposit would fall within a class of mineral deposit widely known as redbed copper deposits. These deposits formed under conditions where

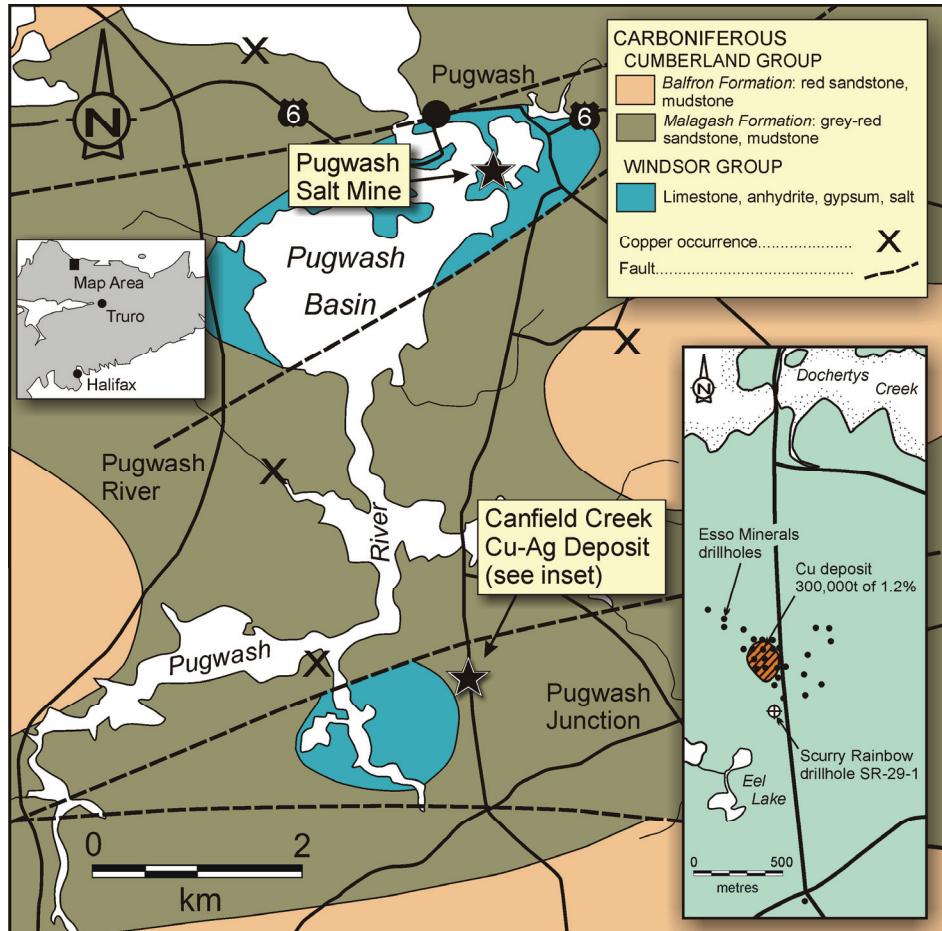


Figure 1. Geology of the Cumberland Basin between Pugwash and Canfield Creek, showing the location of the Canfield Creek Cu-Ag deposit.

oxidized mineralizing fluids in equilibrium with the highly oxidized redbeds mixed with reducing basinal brines and deposited their dissolved metals wherever reducing conditions were met, in this case in the highly reduced, organic-rich lag deposits. An analogy for the Canfield Creek deposit would be the solution front-redox deposits of the western United States (Nacimiento Cu-Ag deposit) or the Dzhezkazgan Cu-Ag deposits of Kazakhstan.

Several of the numerous copper occurrences in the Cumberland Basin were mined on a small scale in the early years of the 20th Century. Canfield Creek represents the largest example of this deposit type known in the

province. What may be most interesting about Canfield Creek, however, is that the entire story has not been told. For instance, portions of the deposit remain open along strike. In addition, there are clearly other reduced, organic-rich units within the redbed sequence, and several of these show indications of mineralization that warrant further evaluation. There has essentially been no drilling to any significant depth below the defined deposit, even though similar rocks persist that may contain more mineralized zones. Let's hope that some day more work is done to finish the story that serendipity began in 1966.

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