Reinterpretation of Field Data from Ag-Pb-Zn (F-Ba) Mineralization in the Sierra de Santa Rosa, Melchor Muzquiz, Coahuila, Mexico

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The following work is a reinterpretation of data obtained in an exploration project in Melchor Muzquiz Coahuila, in the Sierra de Santa Rosa, from April 2019 to July 2019. To date, the type of deposit occurring in the area has not been fully defined due to limited alteration and mineralization evidence. Polymetallic mineralization is manifested as barite and fluorite replacements in mantos, in addition to calcite veins with galena nodules and disseminated silver in calcareous horizons; anomalous concentrations of critical elements such as Ga, Cd, and W can be detected in some key zones. Three fluid migration events are proposed for different evolutionary stages of the Sabinas basin. Terraspec infrared spectrometric data identified illite-smectite, montmorillonite and kaolinite-smectite clays present in the mineralized structures; this association is typical of low temperature (<200°C) mineralizing fluids. Kaolinite is commonly formed through the reaction of sulfuric acid derived from the oxidation of sulfides by the action of meteoric waters. Old mine workings with greater mineral evidence exhibit anomalous surface Ag-Pb-Zn values; the flow of metallic ions from the surface to the subsoil has left in its path halos of meteoric clays between the mineralized structures and potentially enriched zones in favorable horizons within the boundary between the water table and the oxidized, vadose zone. The margin of the El Cedral fault is interpreted as a replica of the regional La Babia fault, the northeastern limit of the basin, and was the potential conduit for fluids confined to the basin floor. A Mississippi-Valley-type mineralization model is proposed for Sierra de Santa Rosa Ag-Pb-Zn deposits; further fluid inclusion analysis in the calcite veins mineralization may provide additional genetic evidence associated with these deposits.