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Geophysical Survey of Gossans in the Eastern Uinta Mountains, Utah DANIEL NATTER, DAVID SUTTERFIELD, EPHRAM MATHESON, ANDREW FLETCHER, MICHAEL ARNOFF, ANDREW LAWRENCE, STEVEN EMERMAN, STEVEN FELLOWS, Utah Valley University — When sulfide-bearing rocks are exposed to oxidizing conditions, they become destabilized, leaving behind a framework of leached, altered, and replaced host rock called a gossan. Many of these gossans form by the oxidation of ore minerals and are associated with ore deposits. There have been no previous published studies of gossans in Utah either in terms of their economic potential or geophysical signature. The objective of this study was to determine the geophysical signature of gossans exposed on the eastern margin of the Uinta Mountains in Utah. The gossans overlie a wedge of Mississippian Madison Limestone and are bounded by the South Flank Fault, which forms the boundary between the Permian Weber Sandstone to the south and the Neoproterozoic Uinta Mountain Group metaquartzites to the north. The geophysical surveys included electrical resistivity, induced polarization (IP), self-potential, total magnetic field, and magnetic susceptibility of exposed rocks. Inversion of the resistivity and IP measurements shows both a resistivity low ($200 \Omega\cdot\text{m}$) and a chargeability high (7 ms) below a depth of 23 m. Magnetic anomalies of amplitude 100 nT and wavelength 50 m are consistent with magnetic models that include isolated bodies of elevated magnetic susceptibility (0.08 SI units) with upper surfaces 20-30 m below the surface. Since the depth to the water table is also 20-30 m, the geophysical measurements are consistent with reduced sulfide bodies below a depth of 20-30 m.

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