

HOST ROCK ELEMENTAL CONSTITUENTS OF BLACK HILLS ORE BODIES. Jacob A. Frederick, frederjd@mail.uc.edu, and Amanda M. Hunt, Ph.D., huntad@ucmail.uc.edu, Geology Undergraduate Research, University of Cincinnati Clermont College, U.S.A.

The 2017 USGS critical minerals list is focused on 23 minerals that are vulnerable to supply access, supply inadequacy, and increased need. These factors are subject to technological/industrial advances and requirements, depletion, and global political/economic conditions. These elements are those considered to be necessary to the national security. Two of the most critical mineral groups are the rare earth elements (REE) and the platinum group. Exploration within the U.S.A. will be intensive with attempts to increase national production. Samples from field work in the Black Hills during the 2017-2018 summer field seasons were prepared for analysis according to sample preparation protocol recommended by the tool manufacturer, Thermo-Scientific Fisher. This includes pulverizing rock to powder for increased surface area, then enclosing samples in tool specific sample containers for optimal analytical results. A Niton GOLDD T3 hand-held XRF was used in the laboratory to analyze the elemental constituent concentrations in the samples. Analyses of waste materials from abandoned mining operations and host rock suggest that additional critical elements may be present in economically viable concentrations. The identification and the relative abundance of the elemental constituents, including indicators, suggest that platinum group and REE critical mineral resources may be present at or near the sampling locations.

KEYWORDS: Geology; Black Hills; Minerals