COLORADO GEOLOGICAL SURVEY

Open-file Report OF-24-10
Reconnaissance Investigation of Critical Minerals in Mine-Related Waste, Colorado

HOW TO USE THIS ZIP FILE

To open the compressed (.zip) file that you downloaded, double-click on the file. Inside the folder labeled **OF-24-10**, there are a number of files and folders. The report is stored inAdobe Portable Document (.pdf) format. Spreadsheet files are also included as Microsoft Excel files (.xlsx). These spreadsheets include the laboratory data associated with the report as well as a summary of these data. For more about these files, see the enclosed report: *Giebel, A.R. and O'Keeffe, M.K., 2025, Reconnaissance investigation of critical minerals in mine-related waste, Colorado: Colorado Geological Survey Open-File Report OF-24-10.*

Mining plays a critical role in history by providing the materials necessary to support the development of technologies. The mineral mining industry is based on providing commodities for use in the most current technologies and products at any given time. Elements and compounds within mineral deposits that have little demand, or that cannot be extracted economically, are discarded because they have little market value or the cost to extract them outweighs the value. Modern technologies increasingly depend on some of the elements and compounds that were not mined or recovered in the past and were discarded as waste. Several commodities, including trace metals, were recently deemed "critical", referred to as "critical minerals" by the U.S. Geological Survey (USGS) based on several factors. In Colorado, many of these critical minerals are associated with historically mined mineral deposits but were not recovered as byproducts during this time due to the lack of demand or cost to extract. Therefore, critical minerals may occur in historic waste piles located throughout the state.

The USGS is conducting a nationwide effort, with the assistance of states, to evaluate the ability of mine waste to contribute to the U.S. critical minerals supply with the goal of estimating the potential critical mineral endowment of mine waste nationwide. The main goal of this investigation is to support the evaluation of potential critical mineral endowment of mine waste in Colorado. This investigation was conducted in conjunction with the early stages of this program under the USGS Earth Mapping Resources Initiative (EarthMRI) who provided funding, laboratory analysis, and the preliminary sampling protocol for this project. The tasks associated with this project included the collection and analysis of waste rock or tailing samples from from select historic mine waste pile sites located within areas of interest (critical mineral focus areas). This report includes the background information associated with these sites, the sampling methods, laboratory results, and a preliminary evaluation of these results with respect to the critical minerals and other commodities. This investigation is reconnaissance in nature and the data associated with this project are not intended to fully characterize potential economic resources or provide a complete assessment of other conditions at these sites.

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HOW TO IDENTIFY AND READ FILES REPORT DOCUMENTS

- **OF-24-10_ReadMe.pdf**
  This file.

- **OF-24-10_CrMinMineWaste.pdf** *The main report document.*

- **OF-24-10_AppendixB.zip**
  MS Excel files containing the laboratory data and a summary of this data.

To view .pdf files

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For further information or assistance, visit or call the Colorado Geological Survey at:

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