

Core Scanning

The Alberta Geological Survey (AGS) has published extensive mineral information using advanced photography and scanning technology called hyperspectral imaging (HSI). Using this technology, the AGS has examined more than 50 000 metres (m) of Alberta core samples and has made 35 terabytes of raw data available to the public.

The data will provide new insights into the geology of Alberta, assist in the identification and characterization of mineral occurrences, investigate mineral occurrences that may have been previously overlooked, and highlight areas of interest where further mineral exploration is warranted.

HSI uses a range of electromagnetic radiation frequencies from 1000 to 12 000 nanometres (nm), which includes the visible near-infrared (VNIR), short-wave infrared (SWIR), and long-wave infrared (LWIR). The visible light spectrum, for comparison, ranges from 380 nm for violet light to 750 nm for red light.

The traditional method for mineral classification is X-ray diffraction (XRD) analysis. Although this technique is effective

for analyzing minerals, it can be time consuming, costly, and (most significantly) destructive. XRD requires samples to be cut from the core with a rock saw, crushed into a fine powder, and then analyzed by XRD equipment to determine the minerals that compose the rock. In contrast, HSI uses a nondestructive approach that does not require cutting the core for a physical sample.

The scanned cores were selected from the core inventory at the Alberta Energy Regulator's Core Research Centre in Calgary and the AGS's Mineral Core Research Facility in Edmonton. Cores were selected based on geospatial distribution and intersected stratigraphic formations.

The [raw data](#) are now publicly available and can be reviewed and analyzed by geoscientists, academics, and the mineral exploration industry. The AGS will also analyze the data to create new information products such as interactive maps and interpretive reports. These products will provide insights for a general audience.

Highlights

The AGS has examined more than 50 000 metres (m) of Alberta core samples and has made 35 terabytes of raw data available to the public.

Analysis using HSI is several orders of magnitude faster than XRD.

20 vs **1000 m**
XRD samples analyzed per day vs cores scanned per day with HSI

"Hyper" indicates that the target spectrum is beyond visible light.

"Hyperspectral" refers to the wavelength of infrared features (e.g., VNIR, SWIR, LWIR).



A unique camera is used for each target spectrum (e.g., VNIR, SWIR, LWIR).



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Core inventory from AER's Core Research Centre and AGS's Mineral Core Research Facility provides broad geospatial distribution of core intersecting various stratigraphic formations across the province.

HSI Spectrum

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