

# SPECTRAL EVOLUTION

## Bitumen in oil sands

Oil sands are typically mixtures of sand, clay, water, and bitumen. They represent a viable source of heavy oil that does not flow unless treated. Oil sands mining requires a way to estimate total bitumen content (TBC) both to gauge the economic viability of a discovery and to prepare for economically viable treatment typically through heated water and process additives to separate the bitumen. Deposits are not homogenous but include variability in clay, bitumen and fines that impact recovery. The major known oil sands deposits are in the Athabasca region of Western Canada, Venezuela, Kazakhstan, and Russia.

Using a SPECTRAL EVOLUTION oreXpress™, oreXplorer™, or oreXpert™ field spectrometer with EZ-ID™ mineral identification software, a geologist can scan and identify bitumen in oil sands and help determine the economic and production viability of a deposit. The correlation of bitumen concentration can be gauged from the oil absorption features in the spectra. Key distinctive absorption features can occur at 1400 nm for water, 1720 nm for oil, 1940 nm for water, 2200 nm for clay, typically kaolinite or smectite, and 2310 nm for oil.

Current methods for identifying bitumen are costly and time-consuming, requiring transport to a lab and typical sample prep that destroys the sample. With a field spectrometer, fast and precise measurement can be performed on site to provide for in the field evaluation of bitumen content, as well as an assessment of concentration and the mix of clays and other minerals.

UV/VIS/NIR spectrometers and spectroradiometers from SPECTRAL EVOLUTION deliver fast, accurate, and flexible ways to measure bitumen with:

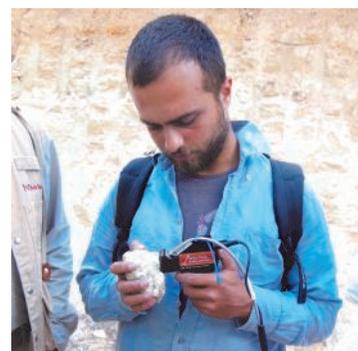
- ◆ Fast collection of data in minutes with no sample prep or sample destruction
- ◆ Precision, accuracy, and a wealth of information—especially if the spectra are combined with chemometrics analysis
- ◆ Affordable measurement technology
- ◆ *In situ* measurement with portable, field spectrometers

The oreXpress, oreXplorer and oreXpert provide:

- ◆ Spectral range of 350-2500nm
- ◆ Reliable one-touch operation with autosshutter, autoexposure and auto-dark correction before each new scan – no optimization step
- ◆ Small and lightweight with rechargeable Li-ion batteries
- ◆ Superior signal to noise ratio: faster scan times and better reflectance measurement
- ◆ Single user operation with optional rugged ALGIZ 8X tablet that provides a sun-light readable screen plus the ability to tag spectra with GPS, digital images, and audio notes
- ◆ EZ-ID mineral identification software with three libraries for over 1100 minerals plus the Custom Library Builder module for creating your own sample spectra library



*SPECTRAL EVOLUTION field spectrometers like the oreXpress are simple, non-destructive, reliable, fast and accurate for TBC measurements.*



*The oreXpress is lightweight and easy-to-use, purpose-built for mining field work.*

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