

ENVIRONMENTAL MINERALOGY

SERVICES FOR SUSTAINABILITY

High Definition Mineralogy offers a wide range of applications for the environmental strategies of companies in many industries. The key emphasis of our services focuses on:

- The identification of minerals or phases in natural or industrial environments and products to determine the potential for future contamination
- Develop remediation plans including the treatment and processing of products and waste material
- Establish methods to control the redistribution of minerals in the environment
- As a proactive measure to put in place safety and quality monitoring systems

SGS' expertise can be brought to bear on:

- **Mineral or phase identification and characterization (mode of occurrence)**
Minerals or specific phases can be identified using High Definition Mineralogy and then correlated with known characteristics or behaviors (e.g. sulphides and relative leachability, dust particle sizes and related respiratory dangers, fly ash composition in terms of its source or toxicity).
- **Search-and-analyze strategies**
High Definition Mineralogy can support search-and-analyze programs where soils or waste materials are assessed for specific contaminants in the sample. For instance, soils in a given catchment basin could be analyzed for metal particulates arising from industrial activity downwind or downriver from a point source emitter.



- **Acid rock drainage assessments**
SGS can perform a full mineralogical characterization of rocks, ore and tailings to determine its acid generating or acid neutralizing potential. From such characterizations, acid generating minerals (e.g. pyrite, marcasite, pyrrhotite) and acid neutralizing minerals (e.g. calcite, dolomite) can be quantified. The ratio of these minerals and their locking or liberation characteristics will determine if a sample will be a net acid generator, thus assisting with environmental planning, closure planning, and rehabilitation projects. This type of core data can then be used to determine project costs.
- **Soil remediation**
SGS' Advanced Mineralogy Facilities can determine the various mineral components of soils, sediments or tailings, thus providing information to assist with treatment and processing. The department of contaminant heavy minerals can be critical to the evaluation of long-term environmental stability or selection of the correct remediation processes. High Definition Mineralogy can differentiate between metallic, oxide, carbonate, sulphide or sulphate forms of arsenic, mercury, cadmium, lead and other metallic phases. **Dust particle size and composition analysis**
What is "dust" and is it hazardous? SGS' High Definition Mineralogy will address these questions for many applications including construction sites, mines or quarries, ports or terminals and transportation facilities (automotive emissions and exhaust).
- **Contaminant mapping in soils, sediments or tailings**
SGS High Definition Mineralogy can be used to capture digital images, identify contaminate phases, confirm chemistry and provenance and map contaminant plumes. We can also determine the chemical form of a mineral (i.e. sulphide or alloy), thus assisting with remediation plans.

- **Industrial hygiene testing for silica and asbestos**

Respirable silica and legacy asbestos are two of the various parameters that are monitored by many firms. SGS' Advanced Mineralogy Facility uses High Definition Mineralogy techniques to determine and mitigate these parameters and help you minimize environmental and industrial hygiene concerns.

- **Forensic mineralogy and assessments**

SGS is not CSI, but many of the technologies in our Advanced Mineralogy Facilities have forensic-type applications for inorganic materials. For instance, we can match sand or soil profiles, image breakage patterns, investigate metal failure and corrosion concerns (physical metallography), document spreading plumes and compare or contrast microchemical analysis of specific metallic phases or materials.

- **Digital imaging with or without related microchemical analyses**

A picture is worth a thousand words and SGS' Advanced Mineralogy Facilities have a variety of scanning analytical technologies that use scanning electron microscopy (SEM) to provide the digital image you need and the chemical analysis to go with it.

The extensive range of approaches described above can be applied to:

- Rocks, ores and processing products
- Tailings and waste rock
- Soil composition and rehabilitation
- Industrial products and wastes
- Scales, slags and residues
- Metals and alloys (e.g. construction and industrial materials)
- Filter deposits
- Fly ash.

CONTACT INFORMATION

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