ANSTO Minerals

ANSTO Minerals is Australia’s leading consultancy group in the extraction, processing and handling of uranium ore and other minerals and mineral products that contain radioactivity.

With 25 years of experience in the field, ANSTO Minerals has provided consulting and R&D services to all of Australia’s and many international uranium mining projects. These services have included sample analyses, site audits, process development and plant trials. The group continues to be involved with every current Australian uranium mine, which collectively produce about 10,000 tonnes of uranium oxide a year, and with uranium projects in southern Africa.


**Uranium specialists**

ANSTO Minerals’ scientific and technical staff are specialists in uranium ore processing but their expertise also extends into other mineral sectors, including rare earths, copper, nickel, cobalt, tantalum, niobium and mineral sands. This expertise spans mineralogy and geology, analyses, chemical engineering, hydrometallurgy and radiation safety.

The organisation’s bench-scale and pilot-plant facilities are available for problem-solving and R&D related to in-situ, in-tank and heap leaching, solvent extraction, ion exchange, membrane technologies, precipitation, neutralisation of process waste liquors and treatment and recycling of waste waters. The services offered range in application across all stages in the life of a mine, including flowsheet development and testing for a new mine, process improvements for the changing orebody during mining, including water recycling, and ultimately at and beyond the mine’s closure.

**Naturally occurring radioactive materials**

In addition to its uranium processing expertise, ANSTO Minerals is the eminent authority in Australia on the analysis and treatment of the naturally-occurring radioactive materials thorium, uranium and their progeny in mineral processing circuits. For example, in the heavy mineral sands industry, the processing of ilmenite to produce synthetic rutile can concentrate its thorium content, leading to commercially unacceptable levels of radioactivity in downstream products. ANSTO Minerals provides confidential advice to industry on the health and safety implications of the presence of radioactivity, the management of radioactive wastes and treatment processes to remove radioactivity from mineral products.

Process design in minerals processing and metallurgy is a key strength. An example has been ANSTO Minerals involvement in the development of a leaching process that removes the radioactive elements that contaminate smelter dust. The process allows for the recycling of dust and hence improved recovery of precious metals within the smelter.

ANSTO has also had extensive experience in the processing of the radioactive mineral monazite, found in mineral sands deposits, to extract thorium and the rare earth elements cerium, lanthanum and others, which have a wide range of industrial uses.

**Environmental services**

The organisation has an impressive track record in assisting the mining industry minimise its environmental impact. In the 1980s, ANSTO Minerals, with Interox Chemicals, pioneered the use of Caro’s acid as an oxidant in leaching mining.
Caro’s acid was developed as an alternative to a commonly used oxidant, manganese dioxide, which can lead to heavy metal contamination of the groundwater. ANSTO undertook plant trials at Nabarlek, (Northern Territory), where the new process was successfully employed for some years until the mine was eventually exhausted.

Following German reunification in 1990, the uranium mines near the eastern German city of Ronneburg were decommissioned and a massive clean-up of the area commenced. ANSTO Minerals provided early advice on water treatment measures at the former mine and at the Konigstein uranium plant. Today, part of the former mine area is home to a large nature park.

In waste water treatment, the conventional neutralisation process for acidic wastewater using lime or limestone typically produces large volumes of sludge. ANSTO Minerals has developed sludge recycling processes that improve sludge density and help reduce the water usage and costs.

Analytical tools
ANSTO possesses a range of modern analytical tools of value to mining exploration and minerals processing, including some nuclear techniques, such as neutron activation analysis (NAA) and delayed neutron activation analysis (DNAA).

Conventional analytical tools available at ANSTO Minerals include X-ray fluorescence spectroscopy (XRF) and specialised mass spectrometry (ICP OES/MS).

To find out more about ANSTO Minerals’ capabilities and services in mining and minerals processing, contact:

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