Naturally Occurring Radiation and Mineral Sands

Radiation in everyday life

Radiation is part of everyday life. Natural radiation occurs in rocks, soils, fresh and salt water, oceans, vegetation and from cosmic radiation. Natural radiation can be ingested with food and water, while other forms of radiation (like the gas radon) are inhaled. As such, the human body contains radioactive elements such as potassium, and carbon.

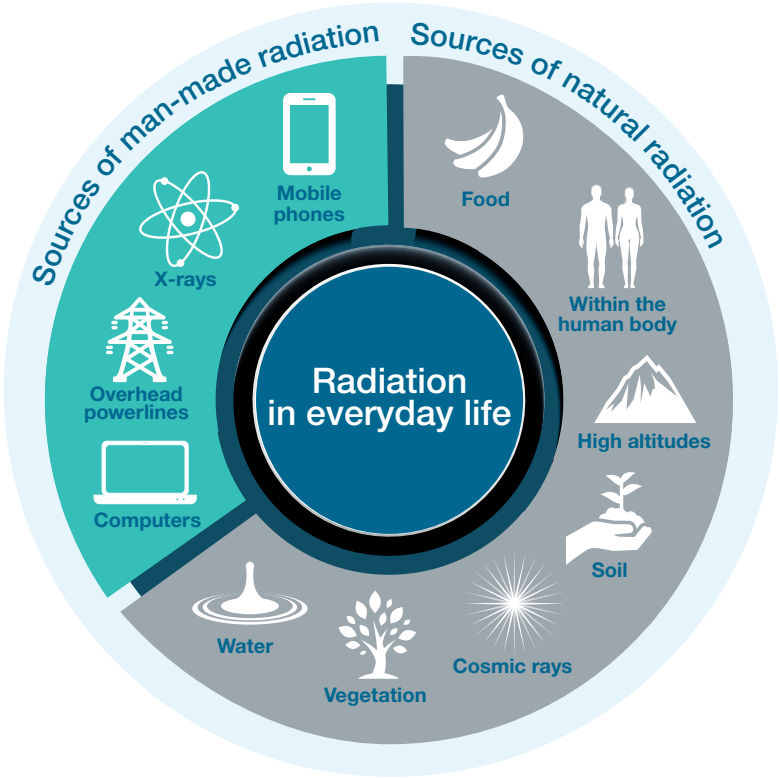
Man-made sources of radiation can be found in many medical, scientific and consumer applications like x-rays, televisions, smoke detectors, mobile phones, building materials and radiopharmaceuticals (used for the treatment of diseases like cancer).

We are all exposed to radiation doses from the natural and man-made environments we live and work in.

Naturally occurring radiation in mineral sands

Mineral sands, as with other minerals such as clay, soils, rocks and many ores, contain levels of natural occurring radioactive material (NORM). This is associated with low level, naturally occurring uranium and thorium contained within the grains of the minerals monazite, xenotime, zircon and some ilmenites.

While the level of NORM in most natural substances is low, any operation in which material containing radiation is extracted from the earth and processed, can potentially concentrate NORM in the mineral sands products, by-products and waste (residue) materials. For this reason, stringent, internationally-accepted radiation management standards are adopted to minimize the potential risk to human health and the environment.



NORM management at Iluka

Iluka applies radiation management practices that are aligned with international best practice according to the publications of the International Commission on Radiological Protection, the International Atomic Energy Agency's, as well as the relevant country's legislation. The annual legal dose limit a person can receive is set by the International Commission on Radiological Protection and is specified as exposure levels above the natural background radiation that exists at that location.

Iluka identifies, assesses and controls risks associated with exposure to radiation from NORM, radon gas and man-made sources through all phases of its activities, from exploration, project development, operations, rehabilitation and closure.

Iluka's Group Radiation Management Standard and site specific Radiation Management Plans ensure exposure to radiation meets the prescribed statutory limits and is as low as reasonably achievable. Risks associated with exposure to ionising radiation from NORM and man-made sources are identified, assessed and controlled in all areas of an operation, from initial planning to closure.

All of Iluka's products and by-products sold into global markets have associated Safety Data Sheets (SDS). The SDS contain product specification details, including chemical and radiological elements and provides information on the possible hazards, safe storage, handling and disposal of those materials.

The transportation of Iluka's NORM complies with the relevant radiation safety legislation of the country jurisdiction through which the material is transported. The majority of materials transported, including mineral concentrate, finished product, by-products and waste streams from mineral separation activities, are of low concentration levels and therefore do not require specific safety measures.

Further information

Australia: Ionising Radiation & Health, Australian Radiation Protection and Nuclear Safety Agency
Understanding Radiation, Australian Radiation Protection and Nuclear Safety Agency

USA: Radiation Protection, United States Environmental Protection Agency

IAEA: International Atomic Energy Agency

ICRP: International Commission on Radiological Protection