The purpose of this guide is to provide a set of procedures for the safe handling, storage and monitoring of the radioactive geological samples held by the Earth Science discipline at UNE.

For all advice on naturally occurring radioactive geological samples, UNE staff must consult with Earth Science academics. For university-wide radiation safety matters, consult the UNE Radiation Safety Officer, the UNE Hazardous Substances Safety Advisor, or any member of the UNE Radiation Safety Reference Group.

**Responsibility**

The management and execution of these procedures and their associated compliance is the responsibility of the convenor of Geology and if necessary the Head of School Environmental and Rural Science. Should academic staff require naturally occurring radioactive samples to be processed they must communicate the samples nature to the technician.

**Monitoring**

Radon and radiation ARPANSA monitors to be deployed annually in the Rock Store and sample preparation labs to monitor radioactivity and radon gas levels.

**Storage**

All radioactive samples are to be stored in a secure storage room and sign-posted with prominent signage. Radioactive samples are not to be stored in any other location. Radioactive samples are to be shielded with a sheet of 10 mm Perspex.

Each container/drawer/tray of radioactive samples is to be tested using a calibrated detector to estimate the dose at 50 cm from the largest surface. If any measurement is greater than 75 µSv/hr then alternative arrangements will need to be made for the storage of those samples (1).

The accumulated yearly dose to any individual from the exposure to radioactive sources, as a result of accessing the radioactive sample storage area, must not exceed 1 mSv in addition to the natural background level (2).

**Handling**

Firstly, staff must seek advice from an Earth Science academic regarding any naturally occurring radioactive specimens. Earth Science academic staff will communicate the nature of geological samples provided to technical staff before work commences.

Any sample preparation procedures or utilisation for teaching must have a risk assessment lodged with the Radiation Safety Committee or Radiation Safety Officer.

Newly collected specimens that are naturally anomalously radioactive will be assessed for their radioactivity by Earth Science staff before storage or any potential sample preparation commences.

The accumulated yearly dose to any individual from the exposure to radioactive sources, as a result of handing or coming close to those samples, must not exceed 1 mSv in addition to the natural background level (2).

**Processing**

Handling of radioactive material for sample preparation purposes can only be undertaken by those with the appropriate Radiation Safety Licence.

Care should be taken to ensure adequate water is used (to prevent dust) when processing (cutting, grinding, polishing, etc) of radioactive samples. Staff to wash hands after processing of samples and all radioactive residue to be removed, stored and disposed of according to local regulations.

**Reporting**

Before undertaking any work requiring the movement or handling of radioactive samples consultation must be made with an Earth Science Academic staff member. Any incidents or hazards associated with radioactive samples must be reported to the convenor of Earth Science and as necessary to the university’s incident reporting system (Skytrust). For this type of reporting the radioactivity of samples should be reported in Becquerel’s and the dose received by a person from a radioactive source should be reported in Sieverts.

**Units used in this safety sheet**

Radioactivity of material:

The SI unit of radioactivity is the Becquerel (Bq). One Bq is one radioactive decay per second (3) and is often reported as Bq/kg or Bq/g. For example, the radioactivity of granite might be 1 Bq/g and uranium ore 500 Bq/g (4).

Radiation dose:

Dose is a weighted measure of the amount of radiation absorbed by the body (3) and is measured in Sieverts (Sv). Dose is usually reported in mSv or µSv. For example, the average yearly background dose received by a person in Australia is approximately 1.5 mSv (5).

**References**

1. Drillcore acceptance, disposal and access - policy and procedures. Geological Survey of New South Wales. Page 16.

2. Radioactive core storage and handling - standard operating procedure. SA Department of State Development. Page 6.

3. <https://www.arpansa.gov.au/understanding-radiation/what-is-radiation/radiation/measurement>

4. <http://www.world> nuclear.org/uploadedFiles/org/Features/Radiation/1\_RadiationandRadioactivity(2).pdf

5. <https://www.arpansa.gov.au/understanding-radiation/radiation-sources/more-radiation-sources/ionising-radiation-and-health>