

B5 - Radiation

1 Scope

This standard is applicable to all Rio Tinto business units and managed operations, including new acquisitions, administration/corporate offices and research facilities located off site; during exploration, through all development phases and construction, operation to closure and, where applicable, for post closure management. It applies to workplace radiation issues and includes both ionising and non-ionising radiation. It covers radiation hazard evaluation, programme design, exposure controls and employee education and training, to ensure that employees, contractors and third parties will not suffer adverse health effects from radiation sources.

2 Programme design - all types of radiation

- 2.1 The risks associated with ionising (from naturally occurring radioactive mineral (NORM), radon, and man-made sources), ultra violet (UV) and electromagnetic field (EMF) radiation exposure must be assessed by a competent person.
- 2.2 There must be an inventory of all relevant types of radiation sources that have a potential for adverse health effect, and should include radiation source type, type of radiation (eg radioisotope, radon, EMF, laser, etc.), strength and unit/material location.

- 2.3 Where risk assessment indicates the need, a documented radiation management programme must be developed such that:
- a) all types of radiation sources are adequately characterised and described;
 - b) such exposures can be eliminated or reduced to as low as reasonably practicable (ALARP);
 - c) it provides a clearly defined chain of responsibility, with duties and responsibility documented; and
 - d) education is provided for employees and contractors regarding radiation safety, including the radiation management programme elements.

3 Programme design - ionising radiation

- 3.1 The ionising radiation management programme must meet all applicable regulatory requirements, and at a minimum include the following elements (as applicable):
- a) surveyed radiation areas and quantification of exposure sources/levels;
 - b) exposure and medical monitoring programmes based on established investigation levels;

- c) transport of radioactive materials in compliance with international radiation transport regulations, when no local regulations are in place;
- d) waste monitoring and disposal programmes;
- e) feedstock and equipment checks for naturally-occurring ionising radiation;
- f) clearance and control procedures for all contaminated materials and equipment leaving or arriving at site (including scrap);
- g) leak (wipe) tests on sealed radioactive containment equipment;
- h) mine ventilation with specific reference to radiation protection (for underground mines);
- i) water management and air emission control;
- j) lock-out procedures for vessels and equipment containing radioactive sources and radon decay product measurement prior to entry;
- k) emergency procedures;
- l) environmental impact risk assessment (air, water, waste, foods, etc);
- m) product/waste life cycle control; and

- n) dose assessment for employees and critical exposure groups, according to documented methods and by a competent person.
- 3.2 Areas with ionising radiation with annual doses greater than 5 milli Sieverts (mSv) must be designated as restricted access or controlled areas. These areas must be identified and mapped, signposted or otherwise clearly communicated to employees working in the area.
- 3.3 All underground operations must have conducted a baseline radon survey using passive area monitoring techniques. All underground operations with an identified radon issue must conduct similar surveys once every two years. Areas with levels greater than the International Commission on Radiological Protection (ICRP) action levels must be designated as restricted access or controlled areas.
- 3.4 These underground designated restricted areas will require the development of engineering controls. Signposting, where necessary, must use appropriate wording or symbols on signs to identify the hazard.
- 3.5 Each person whose potential exposure exceeds 5 mSv per annum or who is a designated radiation worker must undergo periodic personal radiation monitoring and medical surveillance designed to show continued fitness for radiation work.

4 Exposure controls

4.1 Deleted

4.2 All sources of ionising radiation must be managed in use and when they are either disposed of or securely stored in accordance with local regulations. Each operation where individual worker's exposures could exceed 5 mSv per annum must have a trained radiation protection adviser or ready access to a trained protection consultant.

4.3 There must be documented procedures for the inspection, assessment and maintenance of the controls, and emergency procedures to deal with incidents involving ionising radiation sources (including fire and explosions). All controls must be reassessed annually to ensure their continued effectiveness and that operating practices are in accordance with written procedures.

Revision history

Version no.	Effective date	Prepared by	Authorised by	
1	Feb 2003	Richard Gaunt & Ian Firth	ExCo	
Version no.	Revision date	Revised by	Authorised by	Reason for change
4	December 2008	Ian Firth; Adrian van Tonder	Manoel Arruda	Incorporation of suggested changes from operations and alignment with HSEQ management system.