

**Model Work Health and Safety Regulations for Mining - Public Comment Response Form**

<b>Individual/Organisational name: Radiation Health Committee (an advisory body to ARPANSA which includes representatives from radiation regulatory bodies in all jurisdictions)</b>	
<b>Regulations Chapter 9: Mines</b>	
Part 9.1	
<b>Regulation</b>	<b>Comment</b>
Part 9.2	
<b>Regulation</b>	<b>Comment</b>
	<p>In these Regulations a <b><i>principal mining hazard</i></b> is:</p> <p>(a) any activity, process, procedure, plant, structure, substance, situation or other circumstance relating to the conduct of mining operations that could create a risk of multiple fatalities in a single incident or fatalities in a series of recurring incidents, in relation to any of the following:</p> <ul style="list-style-type: none"> <li>(i) ground or strata instability;</li> <li>(ii) inundation and inrush of any substance;</li> <li>(iii) mine shafts and winding operations;</li> <li>(iv) roads and other vehicle operating areas;</li> <li>(v) air quality and dust and other airborne contaminants;</li> <li>(vi) fire or explosion;</li> <li>(vii) gas outbursts;</li> <li>(viii) ionising radiation; or</li> </ul> <p>(b) any other activity, process, procedure, plant, structure, substance, situation or other circumstance relating to the conduct of mining operations, identified by the mine operator under regulation 9.2.1, that could create a risk of multiple fatalities in a single incident or fatalities in a series of recurring incidents.</p> <p><b>Comment:</b> Exposure to ionizing radiation from NORM at the levels normally encountered in mining, even in uranium or mineral sand mines, does not cause acute health effects that can lead to death in the short term. At these levels of exposure the probability (not the severity) of any</p>

harmful effect caused by ionizing radiation is considered for radiation protection purposes to be proportional to the level of exposure.

There is a very large body of scientific literature on this subject, but the general findings are well summarised in an on-going series of publications by the International Commission on Radiological Protection (ICRP). An additional source of information is the series of reports published by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR). Ionizing radiation from NORM should not be classed as a principal hazard, if principal hazard implies a risk of multiple fatalities.

This does not imply that exposures to ionizing radiation should be ignored. Good work practices should require an understanding of the hazards associated with ionizing radiation (hazard defined as the potential to cause harm) and the application of sound OH&S practices to keep the risks associated with ionizing radiation as low as reasonably achievable. This can be achieved by dust suppression, ventilation, washing before eating, cleaning of contaminated vehicles and equipment, etc., i.e. procedures or measures that are often necessary for controlling other hazards.

The use of specialised equipment containing radioactive sources (e.g. fixed radiation gauges, borehole loggers) may require special consideration, as the activity in some of these sources may be high enough to cause acute radiological effects if prolonged exposures occur. Applying the same consideration to exposures from NORM is not justified.

#### Part 9.3

Regulation	Comment

Other Comments

Codes of Practice	
Roads and Other Vehicle Operating Areas	
Section/page number	Comment
Managing Naturally Occurring Radioactive Materials in Mining	
Section/page number	Comment
	The Radiation Health Committee (RHC) will not provide specific comment on the draft Code of Practice, but has instead reviewed existing Radiation Protection Series (RPS) documents prepared through the RHC, with public consultation and published by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). The RPS documents, and specifically the relevant codes of practice, were developed

using a full process of appropriate consultation and justification. This included (but not limited to) a regulatory impact statement, drafting utilising appropriate experts from both industry and regulatory authorities (with extensive experience in radiation protection in mining), extensive consultation and review, approval via the standard ARPANSA practices and eventual publication. It is heavily supported by industry and can be directly linked through to international recommendations, standards and guidelines as well as the national directory.

The following gap analysis confirms that the existing ARPANSA documentation, supported by adoption into States and Territories legislation, fulfils all the objectives Safe Work objectives for this particular hazard. The Radiation Health Committee fails to see any significant advantage in having another code of practice and believe it may give rise to confusion and regulatory inefficiency. The committee also questions the degree of consultation and peer review undertaken in the drafting of the Code and notes some examples in the text which do not appear to reflect current or best practice in the mining industry. The Radiation Health Committee would recommend rather than raising a new and sometimes contradictory code that SafeWork acknowledges the existing ARPANSA Codes as suitable and utilise the existing proven system for ensuring radiation protection aspects.

The documents reviewed include the following Radiation Protection Series documents that specifically address radiation exposure to NORM:

- RPS 9 *Code of Practice and Safety Guide for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing* (2005)
- RPS 9.1 *Safety Guide for Monitoring, Assessing and Recording Occupational Radiation Doses in Mining and Mineral Processing* (2011)
- RPS 15 *Safety Guide for Management of Naturally Occurring Radioactive Material (NORM)* (2008)

and in relation to codes of practice and safety guides applied to the use of radiation gauges and borehole loggers:

- RPS 5 *Code of Practice and Safety Guide for Portable Density/Moisture Gauges Containing Radioactive Sources* (2004)
- RPS 13 *Code of Practice and Safety Guide for Safe Use of Fixed Radiation Gauges* (2007)
- Radiation Health Series (RHS) 28 *Code of practice for the safe use of sealed radioactive sources in borehole logging* (1989)

These documents are all available at <http://www.arpansa.gov.au/Publications/codes/index.cfm>

A gap analysis of these documents against the requirements of the Code of Practice under the model WHS regulations is provided below.

The following relevant sections of the draft model **Work Health and Safety Regulations (Chapter 9)** outline the issues to be addressed.

#### *9.1.4 Meaning of principal mining hazard*

(1) In these Regulations a principal mining hazard is:

- (a) Any activity, process, procedure, plant, structure, substance, situation or other circumstance relating to the conduct of mining operations that could create a risk of multiple fatalities in a single incident or fatalities in a series of recurring incidents, in relation to any of the following: ... (vii) ionising radiation; ...

### *9.2.1 Identification of hazards*

The mine operator of a mine must, so far as is reasonably practicable, identify all reasonably foreseeable hazards associated with mining operations at the mine.

### *9.2.2 Assessment of risks*

### *9.2.3 Control of risks*

### *9.2.4 Review of risk control measures*

## *Division 2 Principal Mining Hazard Management Plans*

### *9.2.10 Duty to prepare a plan*

### *9.2.11 Risk assessment under a plan*

### *9.2.12 Review of plan*

## *Schedule 9.2 – Principal Mining Hazard Management Plans – Additional Matters to be Considered*

### *8. Ionising radiation*

The following matters must be considered in assessing the impact on the safety of workers and others in current and proposed mining operations in developing the control measures to manage the risks from ionising radiation:

- (a) The potential sources of ionising radiation from both natural and manufactured sources, including from dust, air, water, ore and waste from mining and drilling operations, stack emissions, ventilation system emissions, surface contamination, core and sample storage, monitoring equipment;
- (b) The type of radiation (alpha, beta or gamma);
- (c) The levels of radiation, including background radiation;
- (d) The potential for and length of exposure.

So taking into account the above regulations the potential hazards in mining situations relating to ionising radiation were considered. There are two basic situations where radioactive sources are dealt with in mining and milling, the use of gauges and exposure to naturally occurring radioactive material (NORM).

### **1. Use of radioactive gauges**

The following ARPANSA codes of practice and safety guides apply to the use of gauges:

- RPS 5     *Code of Practice and Safety Guide for Portable Density/Moisture Gauges Containing Radioactive Sources* (2004)
- RPS 13    *Code of Practice and Safety Guide for Safe Use of Fixed Radiation Gauges* (2007)
- RHS 28    *Code of practice for the safe use of sealed radioactive sources in borehole logging* (1989)

Given that the use of gauges is not fundamentally different from applications in other industries, and that their use is regulated by State and Territory regulators under radiation protection legislation, there appears to be no advantage in including their regulation under Work Health and Safety legislation.

## **2. Naturally occurring radioactive material (NORM)**

As stated above in our comment about the WHS Regulations Part 9.2 it is not considered feasible that operations involving NORM could create a risk of multiple fatalities in a single incident or fatalities in a series of recurring incidents, due to the relatively low levels of ionising radiation involved. Hence operations involving NORM could not be classed as a principal mining hazard from a radiological perspective.

Additionally, the following Radiation Protection Series documents specifically address radiation exposure to NORM:

RPS 9 *Code of Practice and Safety Guide for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing* (2005)

RPS 9.1 *Safety Guide for Monitoring, Assessing and Recording Occupational Radiation Doses in Mining and Mineral Processing* (2011)

RPS 15 *Safety Guide for Management of Naturally Occurring Radioactive Material (NORM)*

RPS 9 in particular details the requirements for a Radiation Management Plan, while RPS 9.1 details implementation of monitoring, assessing and recording occupational radiation doses under that plan. These documents were assessed against the requirements of the draft Regulations relating to hazards. RPS 15 discusses the radiological, regulatory and operational issues associated with NORM management. RPS 15 uses the term NORM Management Plan to emphasise the fact that operations involving NORM usually require understanding and careful management of the materials and procedures used, rather than full regulatory control.

### **9.2.1 Identification of hazards**

Covered under section 3.8.1(a) ("Sources of exposure") of RPS 9, and section 2.1 of RPS 9.1. Background information on NORM in various industries is provided in RPS15 section 2 ("Some industries where radiation protection issues may arise in dealing with NORM").

### **9.2.2 Assessment of risks**

Covered under sections 3.8.1(c), (d) ("Monitoring", "Dose estimates") of RPS 9, and chapter 4 of RPS 15 ("Regulatory issues in NORM management"). The assessment of risks is further covered in detail throughout RPS 9.1.

### **9.2.3 Control of risks**

Covered under section 3.8.1(b) ("Control Measures") of RPS 9, and section 5.3.1 ("Control/mitigation procedures") in RPS 15.

### **9.2.4 Review of risk control measures**

Covered under section 3.8.4 ("Review and Assessment") of RPS 9, and section 6 of RPS 9.1 ("Assessment of performance against dose criteria").

Although, as mentioned above, it is not expected that exposure to NORM would constitute a principal mining hazard, the RPS requirements of a Radiation Management Plan were assessed against the requirements for a principal mining hazard management plan.

#### 9.2.10 Duty to prepare a plan

Assessment of the need to regulate NORM is addressed in detail in section 4.3 of RPS 15, while management operational issues are covered in RPS 9 and in section 5 of RPS 15.

#### 9.2.11 Risk assessment under a plan

Dose and impact assessment for NORM operations and industries are discussed in section 4.5 of RPS 15, while operational management issues are covered in section 5 of RPS 15. Investigation and analysis methods are covered in detail in RPS 9.1.

#### 9.2.12 Review of plan

Covered under section 3.8.4 (“Review and Assessment”) of RPS 9, and section 6 of RPS 9.1 (“Assessment of performance against dose criteria”).

#### Schedule 9.2 – Additional Matters to be considered

Covered under section 3.8.1(a) of RPS 9.

In summary, existing RPS documents cover all the requirements of the draft model Work Health and Safety (Chapter 9) for hazards related to activities involving ionising radiation in the mining industry. Moreover, most of these activities are currently regulated by State and Territory regulators under radiation protection or mining legislation in accordance with the agreed radiation safety framework as set out in the *RPS6 National Directory for Radiation Protection*.

### The Mine Records

Section/page number	Comment
WHS Management Systems in Mining	
Section/page number	Comment
Inundation and Inrush Hazard Management	
Section/page number	Comment

Emergency Response in Australian Mines	
<b>Section/page number</b>	<b>Comment</b>
Strata Control in Underground Coal Mines	
<b>Section/page number</b>	<b>Comment</b>
Ventilation of Underground Mines	
<b>Section/page number</b>	<b>Comment</b>
Survey and Drafting Directions for Mine Surveyors	
<b>Section/page number</b>	<b>Comment</b>
Health Monitoring	
<b>Section/page number</b>	<b>Comment</b>
Mine Closure	
<b>Section/page number</b>	<b>Comment</b>
Ground Control in Open Pit Mines	
<b>Section/page number</b>	<b>Comment</b>
Ground Control for Underground Mines	
<b>Section/page number</b>	<b>Comment</b>

Underground Winding Systems	
<b>Section/page number</b>	<b>Comment</b>