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

Individual/Organisational name: Samantha Sonter, Radiation Advice & Solutions Pty Ltd	
Regulations Chapter 9: Mines	
Part 9.1	
Regulation	**Comment**
9.1.4	In this context, ionising radiation is a chronic hazard, not an acute hazard, therefore would not be a principle mining hazard, as defined in this document, ie, “create a risk of multiple fatalities in a single incident or fatalities in a series of recurring incidents”. This may also be an issue for “other airborne contaminants”. The definition should be expanded to more properly cover chronic hazards.
Part 9.2	
Regulation	**Comment**
Part 9.3	
Regulation	**Comment**
Other Comments	
Schedule 9.2.8 – Under the list of potential sources of ionising radiation, “monitoring equipment” should be replaced with “sealed sources”. This would then include any active monitoring equipment which contain sealed sources and any gauges containing sealed sources, but exclude passive monitoring equipment, which is not a source of ionising radiation.	

Codes of Practice	
Roads and Other Vehicle Operating Areas	
Section/page number	**Comment**
Managing Naturally Occurring Radioactive Materials in Mining	
Section/page number	**Comment**

General	It is not clear how this document adds anything helpful to the current regulatory framework. ARPANSA, being the national radiation protection agency, has already developed a comprehensive Code of Practice, based on international guidelines: Radiation Protection & Radioactive Waste Management in Mining & Mineral Processing (RPS9). All requirements and recommendations regarding radiation protection are already covered in many ARPANSA documents. The proposed code states that in any conflict with ARPANSA legislation, that the latter will take precedence, but in that case, why add this draft code at all? For example, the Australian Dangerous Goods Road & Rail Regulations (ADG) simply refers directly to RPS2 (which regards transport of radioactive material) in their section on Class 7 (radioactive) materials. Why is this approach not considered appropriate for NORM management? It will only have the effect of diluting the authority of the ARPANSA regulatory system. In terms of writing style, many sentences are either written in a painfully roundabout manner, or seem to be missing words, so that the document is difficult to read. The tone of the writing style varies, as does the level of detail in content.
Pg 4, How to use this code of practice	The term “as low as reasonably practicable (ALARP)” should be replaced with “As Low As Reasonably Achievable, social and economic factors being taken into account (ALARA)”, as it is more explicit, and that would bring this draft code into alignment with the radiation protection systems of the ICRP, IAEA, and ARPANSA, as claimed in the scope.
Pg 5, Principal mining hazard management plan for NORMs	The sentence “handling, etc of ore samples that contain uranium or thorium has the potential to expose workers to a radiation hazard” should have “for example” added somewhere, or it is misleading. For instance, waste containing radium is another very common NORM which has the potential to expose workers to radiation.
Pg 5, Principal mining hazard management plan for NORMs	“where no ionising radiation hazards are present whatsoever, a brief written principal mining hazard management plan for NORM requires a simple statement indicating the reasons for holding this view must be done” - word order is painful. Does this mean a hazard management plan for NORM must be written even when there is no NORM, at least to state the reasons to ‘believe’ there is no NORM?? That implies that alongside all the management plans for all the hazards at any given operation, there must also be a long list of all the hazards that do not exist. That sounds unhelpful and unnecessary.
Pg 7, Assessing the risks	Amongst the factors listed under “When undertaking a risk assessment to determine control measures, the following factors …must be considered:” - why include manufactured sources when they were specifically excluded in the scope and application of this code? - why include monitoring equipment as a potential source? If you mean active detectors which contain sealed sources, they fall under the category of manufactured sources, which have been excluded from the scope of this code. - in including background radiation it is not clear whether you mean an operator must investigate their baseline data for natural background

	radiation, or whether they must include background radiation as a risk to be assessed.
Pg 9, Controlling the risks	"There are three categories of radiation exposure: occupational, public and medical." – this would be better categorized as occupational, medical and **background** exposure. A person may receive an occupational or medical dose on top of their natural background dose. The difference between radiation workers and members of the public being the size of the occupational dose, or dose due to industry, that is acceptable for them under regulatory limits.
Pg 9, Hierarchy of control	"The specific control measures for radiological protection are set out below and are listed in a hierarchy (i.e. most effective to least effective): • *Eliminate the risks* - Any decision that alters the radiation exposure situation should do more good than harm, i.e. justification… • *Minimise through engineering controls* – for example, optimisation of protection... • *Minimise through administrative controls* - for example, dose limitation…" - why are you equating the hierarchy of methods of control with the basic principles of radiation protection? They are different concepts. You optimize and limit doses **using** the hierarchy of controls.
Pg 10, Principles of best practicable technology	"The person controlling a business or undertaking at a mining operation should be able to demonstrate that the operation is employing the best practicable technology that it is reasonably practicable to use and that radiation doses to workers received as a result of that operation *, so far as is reasonably practicable." – should this have "are minimized" at the asterisk?
Pg 10, Principles of best practicable technology	"The management plan for NORM should document how …the procedures that have been adopted to ensure the radiation exposure of persons employed at, or affected by, the mine are not just below the relevant dose limit, * **so far as** is reasonably practicable." – should this have "but are as low as" replacing the "so far as" at the asterisk?
Pg 10, Principles of radiation design	The cornerstones of the international system for radiation protection are justification, limitation and optimization. All **three** principles are used in the design stage as well as all throughout the life of an operation.
Pg 13, Controlled area work practices	"Disposable clothing or easily cleaned clothing like **waterproof garments** would be required for those tasks where clothing may become contaminated if the potential for personal contamination cannot be engineered out of a task." – having previously mentioned the need for laundering facilities, surely "easily cleaned clothing" means anything that can be put in a washing machine (and, of course, meets other site PPE requirements, eg, hi viz, etc).

Pg 13, Classification of supervised areas	"The use of supervised areas can be used to highlight areas of marginally elevated exposure levels. As exposures to all personnel are to be kept as low as practicable, then knowledge of any elevated exposure levels can eliminate unnecessary exposure." – what does this mean?? How does the mere knowledge of elevated exposure levels coupled with the concept of ALARP mean that unnecessary exposure has been eliminated? Knowledge of a hazard does not eliminate that hazard; design and procedure eliminate or reduce it. Is this paragraph meant to implicitly refer to the previously mentioned minimum constraints required for supervised areas? If so, be more explicit.
Pg 14, Areas outside supervised areas	"In the assessment of the internal exposure from airborne radioactivity outside of supervised or controlled areas, unless there is evidence to the contrary, the relevant dose conversion factor for the member of the public default aerial median aerodynamic diameter (AMAD) of 1 μm should be used." – why bring up dose conversion factors and AMAD without a proper explanation, and without giving the relevant information for workers as well?
Pg 16, Classifying an exposure result as a special exposure	"if a known or planned task involving an unusual exposure within a work category, or across several work categories, may occur once or even several times in a monitoring period, the exposure received by those persons involved in the task could be assigned as a personal special exposure." – this should depend on more factors. If the "known or planned task", though perhaps infrequent, is routine, or involves several people within the one work category, or the task takes up a significant portion of the monitoring period, or the exposure is significantly higher than usual, then it **shouldn't** be excluded from the work category average. I realize the paragraph on work category sub-groups offers an alternative, but assigning exposures as personal special exposures in this context still seems too much of an easy cop-out. Also, categorizing a worker's exposure as a "special exposure" should not be solely the operator's decision; it should be explicitly stated that this should only be done after discussion with and approval from the regulators.
Pg 17, Investigation levels	In the radiation parameters listed under Investigation Levels, "airborne radiation" is either airborne dust containing long-lived alpha emitters, or radon or thoron in air. It shouldn't be listed as an extra parameter.
Pg 18, Principal mining hazard management plan for exploration	Having stated that "The level of detail included in the principal mining hazard management plan for exploration depends on the degree of potential radiation exposure, which has been estimated or identified, and the expected difficulty of controlling it.", which is correct, it is then too simplistic to follow up with that statement that "management plans for uranium exploration would be more comprehensive than those prepared for a mineral sands exploration". The **source** of the radiation exposure is not the issue; the (estimated) **level** of exposure is the issue. If there was a uranium exploration program of surface transects, which is a common stage of greenfields exploration, then those workers' estimated radiation exposure may be nigh on negligible. Other factors must be considered besides the target mineralization, such as duration of exploration program, and type of activities to be carried out. For example: will there be ground disturbance or not? If drilling, RC vs diamond? what radiation doses are expected, or can be estimated?, etc.
Pg 18, Natural and induced disequilibrium	In the context of exploration, the issue of disequilibrium and ore grade estimation, is a purely a problem for geologists and is not relevant to radiation protection.
Pg 20, Minimum standards for	"monitoring and analysis of collected samples should be carried out in accordance with this Code" – no, monitoring and analysis should be

radiation controls and monitoring	carried out in accordance with what has been committed to, and approved by, the regulator.
Pg 20, Minimum standards for radiation controls and monitoring	"Gamma radiation does not generally require any active control measures as it can be monitored with a survey meter" – this statement makes no sense. Knowing gamma monitoring results does not mean that doses are being kept as low as reasonably achievable. The need for active control measures depends on how high radiation levels are, not whether you've monitored them or not!
Pg 21, Core and sample storage	"**wooden or steel** core stores containing significant amounts of mineralised core should be ventilated when workers are inside" – it doesn't matter what core stores are made of; what matters is if it is an enclosed space. "Cores should ideally be placed on a concrete floor which has been sealed and, where practicable, painted in a different colour to the core. The core [store, I assume] should be covered with a roof leaving the sides open" – why? How does that reduce radon build up? It doesn't limit other radiation exposure pathways, either. A concrete floor aids in spill cleanup, but otherwise this recommendation is not helpful.
Pg 21, Core and sample handling	Most of the precautions listed are not only impractical, but completely ridiculous. The only sensible suggestions are to store bulk samples in a well ventilated area, refrain from handling samples unnecessarily, and to wash your hands afterwards.
Pg 25, Institutional controls	"In the first aid procedures, **special precautions** in the cleaning of wounds of potentially radioactive material must be clearly described." – like what? The potentially radioactive material would generally be dirt which may contain some radionuclide, such as uranium, and as such, can be cleaned off like any other dirt.
Pg 25, Worker training	What does "vida supre" mean? Is latin necessary?
Pg 27, Transport of radioactive material	"types of packaging (where applicable) and **signposting**" – what does "signposting" refer to? In this context, do you mean the labeling of packages and placarding of transport vehicles, or something else entirely? Be clearer.
Pg 28, Waste management system	"Wastes should be treated as though they contain **deleterious** levels of NORMs until there is **evidence** to the contrary." – this statement needs more detail on what would count as either deleterious, or as evidence to the contrary. What if it's general waste? Of it's excess samples from low mineralization or barren areas? What if it's excess mineralized samples, but is insoluble?
Pg 40, Appendix A	ARPANSA's RPS9, The Code of Practice and Safety Guide for Radiation Protection & Radioactive Waste Management in Mining & Mineral Processing, should be the first code of practice listed, as it is the most relevant document and the most comprehensive. Why is it listed as a key publication? Further ARPANSA codes of practice that should be included, at the bare minimum, are RPS 1, 2 and 6. Another key publication that should be added is the IAEA Basic Safety Standards, Safety Series Publication 115.
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	
Section/page number	**Comment**
Strata Control in Underground Coal Mines	
Section/page number	**Comment**
Ventilation of Underground Mines	
Section/page number	**Comment**
Survey and Drafting Directions for Mine Surveyors	
Section/page number	**Comment**
Health Monitoring	
Section/page number	**Comment**
Mine Closure	
Section/page number	**Comment**

Ground Control in Open Pit Mines	
Section/page number	**Comment**
Ground Control for Underground Mines	
Section/page number	**Comment**
Underground Winding Systems	
Section/page number	**Comment**