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

Individual/Organisational name: Australian Uranium Association	
Regulations Chapter 9: Mines	
Part 9.1	
Regulation	**Comment**
9.1.4	The definition of "***principal mining hazard***" does not appear to be consistent with the inclusion of ionising radiation in the list. Although extremely high levels of exposure to ionising radiation can and has the potential to cause fatalities with respect to Naturally Occurring Radioactive Material (NORM), the level of exposure **cannot possibly** reach lethal levels. Ionising radiation is of concern as a carcinogen but the levels found in NORM operations are such that the associated risk is at the extreme lower end of the risk spectrum. This risk is extremely well defined by major international bodies (UNSCEAR, ICRP, IAEA, WHO, ILO, NEA/OECD) and national organisations (ARPANSA). The utilisation of hazardous materials (for example) would represent a far larger risk than ionising radiation in a mining sense. The incorporation of ionising radiation in the principal mining hazard definition seems out of balance with the actual risk and it is questionable whether it should be in the draft regulations at all.
Part 9.2	
Regulation	**Comment**
Schedule 9.2 Part 8	This regulation sub-section would require **all current and proposed mines** to consider not only whether radiation was present at significant levels but also a range of factors which are generally not required for most mines (eg types of radiation, background radiation, potential for exposure). Although this would be extremely beneficial to the few radiation consultants within Australia, it is work which is not justified in well over 90% of Australian mines. Natural radiation is present in **every** material on this planet but is generally present at such a low level that there is no significant risk associated with the material. The lack of any form of de-minimus level of exposure or radioactivity content would cause significant additional resources in operations without significant radiation risk. This sub-section needs to be rewritten to either remove the "must" or reflect more clearly that the work is only required where there is significant potential for exposure to workers, the public or the environment.
Part 9.3	
Regulation	**Comment**
Other Comments	

Issues Paper Page 18: Fully agree with the Suggestion

"*Further discussions are occurring with ARPANSA to ensure there is no duplication or conflict with their legislation. Rather than a separate Mining Code for Ionising Radiation, amending the current ARPANSA Code to pick up mine-specific issues may be a better way forward.*"

This draws on an existing understood and strongly supported framework for radiation protection rather than "trying to reinvent the wheel". The existing framework was developed using a strong base of both industry and regulatory experience and is seen as best practice internationally. The issue of this code of practice will at best result in duplication and confusion over regulation of ionising radiation. More probably, the issue of this code of practice will waste valuable resources in investigating non-existent risks and force the adoption of non-optimal practices on the mining aspects which are already successfully managing ionising radiation hazards. It will also lead to regulatory confusion about who is the appropriate regulator. There is also the very important consideration that the current base of human resources with expertise in radiation protection is extremely small and any diversion from the current regulatory approach is likely to be unsuccessful and characterised by personnel with limited knowledge and expertise. There also seems to be no compelling case for a change in regulatory approach and it is questioned whether a proper regulatory impact assessment has been formed to justify and support this new regulation and code of practice for NORM.

Codes of Practice	
Roads and Other Vehicle Operating Areas	
Section/page number	**Comment**
Managing Naturally Occurring Radioactive Materials in Mining	
Section/page number	**Comment**
OVERARCHING COMMENT	**There appears to be no compelling need or requirement for the adoption of this code of practice on managing NORM in mining. There is already in existence a well understood, widely adopted and strongly supported system for radiation protection in mining. This system has a base in Commonwealth documentation (ARPANSA) covering mining of NORM which has been adopted into legislation by States and Territories. This radiation protection system is fully aligned with the base data of UNSCEAR, the recommendations of the ICRP and the International Basic Safety Standards published by the IAEA. The mining code was developed by acknowledged experts from both industry and regulatory authorities and went through an extensive consultative and approvals process. The current Safe Work Australia draft does not significantly add to the current radiation protection system and in fact would most probably result in reduced protection of workforces and the public. At best it would cause duplication of work and confusion over the regulatory requirements of ionising radiation. It will likely result in the waste of extremely limited resources in radiation protection within Australia. There are also many examples in the draft code where it requires practices which would not be considered best practice or where the approach is not practical.**

	The Australian mining industry strongly supports the need to incorporate strong pre-existing industry and regulatory experience to ensure that resulting Codes of Practice are practical and appropriate. The ARPANSA process utilised this process of effective drafting and consultation throughout document development and this is reflected in the high calibre and the strong support for the resulting Codes. There is concern that this draft code has not gone through a similar consultative process and does not benefit from the practical expertise essential for an effective code of practice. **There is also concern about the way the document is created and the level of detail it goes to which is inappropriate for a code of practice. There are numerous examples where it goes to very specific detail (eg type H vacuum cleaner to be used in core and sample handling) without consideration of the real risk associated with the activity. Many years of industry and regulatory experience has highlighted that Code of Practice should not go to this level of detail as the optimisation of a protection regime is heavily dependent on site specific factors. If this level of detail is desired than it should not be in the Code of Practice but be represented in supporting documents such as safety guides or best practice examples. By incorporating these detailed and often inappropriate requirements it will force non-optimal protection on industry and will stifle development of best practice systems.** **The overall recommendation is that rather than design a new and inappropriate code of practice, Safe Work Australia should endorse the current radiation Codes and Practices as developed by ARPANSA. If there is any compelling need for change, then to work within this current system rather than adding a non-optimal system. In this case a review of the current ARPANSA code of practice would represent a far more efficient and effective approach.** **The following review highlights some of the critical and major flaws in the draft. It is not necessarily comprehensive, as the scope of the regulations implies that it would apply to all current and proposed mines, rather than those where there is a known potential for significant exposure to ionising radiation.**
3rd Page, 2nd para under Scope & Application	The term “without risks” is technically meaningless as everything we do has some element of risk. Need some qualifier such as “insignificant” or “risks are managed”.
4th Page, 1st para	This paragraph does not acknowledge the fact that ARPANSA does **not** provide the legislation for individual States and Territories. For all mining operations ARPANSA has no regulatory jurisdiction. The general process is for individual States and Territories to either directly reference the ARPANSA Code(s) or incorporate the relevant aspects directly into legislation. Stating that a Commonwealth legislation not designed for regulation of mining activities should take precedence is therefore incorrect. The believed intent of this paragraph was to state that in the event of any conflict between the ARPANSA Code (RPS9) and this draft code than the ARPANSA code takes precedence. This raises the question of why this draft code is required at all. It also highlights that any difference between this draft code and the ARPANSA code is inappropriate and will not be enforced. There are many examples of conflict which will be highlighted in this response form, including the use of ALARA, the definition of controlled and supervised areas, and

	the cut off value for non-designated workers.
4th Page, Last para	The term ALARP is **not** generally used in the radiation industry. Throughout all aspects of radiation protection we follow the ALARA principle which stands for As Low As Reasonably Achievable societal and economic factors being taken into account. The reference to societal and economic factors is a critical aspect as it provides context around how to determine "Reasonable". Some of the worst examples of optimisation of radiation protection have been a result of not correctly including these factors and going for dose minimisation beyond the point where it is justified. The ALARA principle is a recommendation of the International Commission on Radiological Protection (ICRP) and is fully adopted within the current and proposed draft of the IAEA International Basic Safety Standards. ALARA is a critical part of the three key aspects of ICRP's system of radiation protection: Justification, Limitation and Optimisation. It is also very surprising that this code of practice does not clearly mention these key aspects of radiation protection. Instead these principles are "adjusted" to fit within 3.1 Hierarchy of control, and this adjustment is not technically correct (discussed below).
5th Page, 1st para	This definition of NORM is almost an indecipherable sentence which needs to be significantly simplified to improve comprehension. The literal interpretation of this is that every single rock, soil, building product or foodstuff is NORM. This is obviously unworkable and inappropriate for a mining code of practice. At the very least there should be some form of deminimus or exemption level below which material is excluded from being a NORM. This exemption level can be based on the radionuclide concentrations in a material and/or on the potential for exposure to an individual. There are numerous examples of this in both international literature and in Australian legislation. Good examples come from the IAEA document on Application of the Concepts of Exclusion, Exemption and Clearance RS-G-1.7. Without this deminimus level there is potential for the utilisation of the very scarce radiological expertise in Australia to be wasted on conducting work with insignificant radiological consequences.
5th Page, 3rd para	As commented earlier in this response, the inclusion of ionising radiation as a principal mining hazard is debatable and seen to be out of balance with the true potential risk.
5th Page, 2nd last para	This effectively commits EVERY mine, processing and exploration activity in Australia to have undertaken some form of assessment. This is simply not practical for a number of reasons. 1. There would need to be at least some idea whether radiation was present and this would generally require either some site based instrument or some analysis of ore or process streams. This is beyond both the capacity of most operations and there is doubt about whether the analytical capacity for radionuclides is sufficient to perform this work. 2. The expertise to interpret this raw data is not present at most operations, and there are in fact relatively few specialists with the appropriate expertise to reliably interpret this data. To illustrate this point, a very low base radionuclide concentration in the ore or feedstock can give absolutely no radiological risk until a specific point in processing occurs. This may be related to a decay product within the uranium or thorium series and a basic analysis would not pick this up. This has occurred in sintering plants for iron ore where volatile polonium-210 concentrates in stack exit gases and electrostatic precipitator dust. Another example is in the washing of coal where scale can form with elevated levels of radium-226. 3. The likely result will be standard wording in statements with no true determination of risk. 4. If enforced as per the draft code, it will result in a mammoth waste of resources with the majority of cases having no true risk. This is one of the reasons why a deminimus level is required to ensure that the code of practice is applied appropriately and logically. It

	also should utilise the existing knowledge base of current regulators across Australia. The regulatory expertise should be used to determine where the higher priority risk are and to concentrate their regulatory effort on the true risks.
7th & 8th Page, 2.1 Identify hazards & 2.2 Assessing the Risks	To conduct an assessment based on all these factors is appropriate where there is a potential for significant radiological risk. However, For the majority of operations this assessment of the risk from ionising radiation is insignificant and would be totally inappropriate. The level of work recommended is not trivial, and would require significant resources and expertise. Without some form of prioritisation, such as deminimus levels, these sections are unworkable.
9th Page, 2nd last para	The draft code inappropriately tries to adjust the three ICRP principles of radiation protection into the standard hierarchy of control. This is not technically correct and is in fact misleading. For example, the majority of optimisation actually relates to administrative controls as systems are pushed well beyond what the engineering controls can provide. Similarly limitation is very much considered during the engineering controls and some factor of the limit is usually used to assist in the design of engineering aspects.
10th Page, 1st para	The radiation protection industry uses ALARA exclusively not ALARP (see previous comment.)
10th Page, 3rd para	Administrative controls remains one of the foundations of good occupational safety including for radiation protection. Although it is well understood that elimination and engineering controls should be adopted first, administrative controls still remain one of the major ways in which exposures are optimised to levels far below limitation or regulatory concern.
11th Page, Table	In the paragraph the underlying principles are said to be in order of best to worst. However the order in the table is incorrect and is in fact contradictory with statements made earlier in the draft code. Vitally important is the last point on limiting other exposures which should be the first point because the true risk from other exposures are likely to be far higher than the risk from ionising radiation. Source reduction (ie elimination or reduction of the risk) should be placed before source shielding and it could also be stated that optimal technology should also be above source shielding. Education should be above personal barriers which should be the last line of defence.
12th 13th and 14th Page, Classifying work conditions	The definition of Controlled Areas and Supervised Areas used in this draft code are totally inconsistent with the definitions provided in the ARPANSA Code (RPS9). The use of 5mSv/y as the demarcation is not consistent with the ARPANSA code, which instead defines the controlled areas as one where there are "*specific procedures aimed at controlling exposure to radiation*". Using this proposed draft definition would result in a far lower level of radiation protection, than that provided by current practice, as a lot of the current controlled areas do not have the potential to exceed 5mSv/y. The new definition of restricted area is not included in the current ARPANSA code and it is difficult to see how this could be applied to current or potential operations. This classification falls within the current definition of controlled areas and within controlled areas there are different levels and aspects of radiation protection as part of the specific procedures. For a supervising area there is the use of a 25% occupancy factor which seems to be arbitrary but seems to be related to worker exposure. In practice, the use of supervised areas is very dependent on site specific factors and is often related to where the company can apply controls and where their responsibility for ensuring safety resides. For areas outside the supervised areas it is **definitely not** appropriate to have a 1mSv/y limit for hypothetical persons. The ICRP is

	absolutely clear on the need to use realistic representative persons for application of the public dose limit. This subsection is in clear opposition to this approach. For example, it may be possible to come up with a hypothetical group which lives totally unrealistically and could potentially exceed 1mSv/y (ie people who only eat reindeer meet which have exclusively eaten fodder from the stockpiles and have houses built of the worst possible waste material obtained from the mine). The correct methodology is to use suitable representative persons to determine the public dose and these exposures should be compared with the public dose limit.
14th and 15th Page, Classification of workers and dose constraints	The definition used in the draft code relies on the use of 5mSv/y as the cut off for a designated worker. Although this is often used as the demarcation it is not defined as such in the ARPANSA code but is rather used as an example. This current use of 5mSv/y only as an example is appropriate and setting a hard level as suggested by this draft code is inappropriate and may diminish the level of protection. The purpose of using the designated work is to allow the monitoring and resources to be optimised on the fraction of the workforce which has the highest potential for exposure. It is totally foreseeable that some operations may use a different definition of the demarcation for a designated worker to allow this prioritisation to occur. For example, some potentially low dose mines may want to chose a lower value because no one in the workforce has the potential to go over 5 mSv/y/ The provision of criteria for classifying designated workers is also inappropriate. It does not take into account site specific factors which could require higher or lower criteria to be applied, rather than these arbitrary defaults. The use of dose constraints is not in line with the most recent ICRP recommendations which talk about choosing the dose constrain based on the specific sources. A default figure will be counterproductive and actual dose constraint need to be set based on the details of the source and also on the site specific factors.
18th Page, Principal mining hazard management plan for exploration	These introduction paragraphs once again state that radiation monitoring (with quite extensive programs) is required without an assessment of whether it is justified to perform any monitoring at all. This level of monitoring would be beyond the current scope of most exploration activities and should be only performed if there is significant potential for exposure.
18th and 19th Page Natural and induced disequilibrium	Although this is useful information for the resource geologist it is unclear what it provides for a health and safety code of practice. The natural disequilibrium is unlikely to give sufficient change in the results to have a major impact on exposure. For induced disequilibrium it is almost impossible to obtain consistent factors for radon loss, even within a fixed geology (will be heavily dependent on rock characteristics, mineralogy, drilling method and rate, climate, hydrogeology, etc.). A far more practical approach is to seal the samples for a period to allow for radon release prior to performing measurements.
19th Page, last dot point	Having a RSO on site for all exploration is often impracticable particularly if the exploration is not for uranium and mineral sands. The requirement for an RSO should be restricted to only exploration where there is a true potential for significant exposure and even then the responsibility may be devolved to a senior site person acting under the direction of an off site RSO. Similarly, radiation training is only appropriate for exploration activities where there is potential for significant exposure.
20th Page, 2nd para	The statement that dust is typically the greatest source of exposure is incorrect. For most exploration activities of near surface deposits, gamma exposure is by far the dominant pathway. Also the dust exposure is totally dependent on the drilling methodology and equipment.

	For example, exploration involving diamond drilling generates minimal amounts of dust and in this case it is generally a negligible exposure pathway.
20th page, 4th para	Once again the issue of clothing and contamination will be dependent on the specifics of the operation and the level of potential exposure involved. Specifying a depth of 1m for burial of washing is not required in most cases as the dilution of very small quantities is unlikely to result in any change in naturally occurring environmental concentrations. The requirements for contamination controls should be based on the site specific factors rather than default statements which are not justified.
20th Page, 6th para	Gamma exposure can and has been subject to control measures such as having drill pads made of inactive materials.
21st Page, Core and sample storage	It is extremely rare for cores to require being placed on concrete floors which have been sealed with a different colour and this guidance is manifestly inappropriate. Cores are extremely low risk in terms of potential for exposure and utilising standards more often associated with nuclear reactors is not justified. More commonly core storage is in open unroofed areas (maybe shade cloth over some work areas) with either a compacted clay or bluestone base and an earthen sump around the area. To try and use the recommendations in this draft code is totally out of balance with the risk and would result in considerable cost to industry with no significant improvement in safety.
21st Page, Core and sample handling	Once again these requirements are generally more applicable to the nuclear industry rather than relatively low levels of activity associated with mineral exploration. In particular the last dot point is totally inappropriate. A type H vacuum cleaner is not required and would be useless in most core yards which use compacted clay or bluestone bases. Additionally the specification of a P3 mask is total overkill for the low level of risk associated with core handling. If workers doing core handling were required to use P3 masks the resulting impact on heat stress would be incredibly large without a net benefit. It also is against the hierarchy of control where PPE should be the last line of defence rather than a default and unjustified requirement. If PPE is required than a P1 mask is more than adequate for worker protection as can easily be determined by examining the manufacturer's specifications. This type of over-conservatism in this draft code is a major concern as it would give rise to significant detriments to both the industry and the workers.
22nd page, Waste Management	A set value (ie covered by at least 1m of compacted soil) should not be in the draft code but rather it should be determined by the site specific factors. The mixing of bulk cuttings with soil is also not regarded as acceptable practice and should not be incorporated into this draft code.
23rd Page, Contents of the principal mining hazard management plan	Once again the scope of the draft code is not defined and in fact it implies that every exploration activity requires this work. This is non-trivial and should be based on a deminimus level for specific activity and/or potential dose.
24th Page, critical group information	In the most recent recommendations of the ICRP (ICRP 103) the term critical group has been removed and replace by representative person. The draft code should reflect this current approach.
27th Page, Records management and reporting	The draft code should mention the requirements of the Australian National Radiation Dose Register (ARPANSA/DRET) for uranium workers. Although it does not currently include exploration activities there is potential that it may be extended to this area in the future and the requirements are reasonably applicable.

29th Page, Principal mining hazard management plan for mining activities and mineral processing	Once again state the need for deminimus levels so that only those operations with a potential for significant exposure are required to conduct these requirements.
31st Page, 1st para	In the most recent recommendations of the ICRP (ICRP 103) the term critical group has been removed and replace by representative person. The draft code should reflect this current approach.
31st Page, 3rd para	A radionuclide mass balance is a major task and requires highly specialised skills and analytical resources. Although generally a good practice it is only normally justified if there is a very significant radiological risk.
36th Page, Records management and reporting	The draft code should mention the requirements of the Australian National Radiation Dose Register (ARPANSA/DRET) for uranium workers
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**
