

## **Comments on:**

### **Safe Work Australia Code of Practice: Managing Naturally Occurring Radioactive Materials in Mining**

#### **Background**

I have had 33 year's experience in radiation protection in mining and mineral processing. Twenty three years were spent in the radiation protection branch of the SA Government, where I was responsible for the day to day oversight of radiological issues in uranium mining, and for the last 10 years I have conducted my own consultancy business, offering advice on radiation issues to a number of uranium mining and exploration companies. I was heavily involved in the drafting of the ARPANSA code "*Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing*" (RPS 9) and its predecessors. I have also been involved with the IAEA, being principle author of IAEA Techdoc 862 "*Guidebook on the development of regulations for uranium deposit development and production*", and I have been invited to participate in the revision of IAEA Safety Guide "*Management of Radioactive Waste from the Mining and Milling of Ores*".

#### **Comments**

I have serious concerns with this Code in three main areas. The first is the relationship with the existing and well accepted requirements under various pieces of State legislation which invoke approval under the ARPANSA code (RPS 9). The second area, which is related to the first is its purpose and scope, and the third is the lack of knowledge and understanding of radiation issues generally and in mining.

#### **RELATIONSHIP WITH RPS 9**

The relationship with RPS 9 is not properly addressed, and in the few places where it is mentioned, it is very vague. For example P 10 "... their approved radiation management plan", and P 15 "The approved radiation management plan for the mine should contain..." What approved plan? Approved under what legislation? Is it a reference to the plan approved under RPS 9? Is this an instruction to the (State) regulator as to what must be in the plan they approve? Or is it implying that a separate plan and approval is required under WHS legislation? Who would administer and enforce such an additional plan? Such issues have apparently not been discussed with operators or regulators currently using RPS 9.

Even more confusion arises from the "Issues Paper" where it states: "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". What does this mean? The ARPANSA already clearly addresses "mine specific issues": this is its whole purpose.

It does not even appear that the authors of this Code understand the overall system of legislation on radiation protection in mining in Australia. This Code states that the ARPANSA Act and Regulations must be taken into account, lists the ARPANSA Act as a "Key Publication" in Appendix A, and claims that RPS 9 is intended to support "ARPANSA legislation". This is not the case – ARPANSA has virtually no legislative role in the control of radiological issues in mining. This role is taken by the States and Territories, but there is no mention of this and no reference to their legislation in Appendix A. RPS 9 is intended to support State legislative requirements.

## ***PURPOSE AND SCOPE OF THIS CODE***

It is presumed, although as noted above it is by no means clear, that an approved RPS 9 radiation management plan would be meet most if not all of the requirements of this Code. Now the requirements of a plan under RPS 9 are well understood by the industry. Guidance is available, and people regularly produce plans which are acceptable to the regulators. These are in general prepared and assessed using the “risk management process” that this Code requires. Further guidance is not really required, and I must say that if it were, guidance apparently produced by someone with little understanding or experience of radiation protection in the mining industry is likely to be of little use. What *might* be of use is guidance on what additional material (if any) is required to make a plan approved under RPS 9 acceptable under this Code. This document certainly does not do this. Instead it attempts to provide further guidance on the basic RPS 9 plan, and in places it does this in excruciating, unnecessary and inaccurate detail. For example, a PMHP must have a “cover sheet”, and even the contents of this cover sheet are specified! There is half a page on “disequilibrium” (P18) which has (in this context) not the slightest impact on radiation exposure. I could go on, but the point is that in contrast there is virtually no information on what *additional* information might be required to meet the requirements of this Code.

Further substantial confusion arises as to the status of this document either as “guidance” or as enforceable requirements. The Foreword describes it as “practical *guidance*” but then later it is stated that “the words ‘must’, ‘requires’ or ‘mandatory’ indicate that legal requirements exist, which must be complied with”. What legal requirements is this referring to? What are we to make of statements such as that on P 14 “this group of workers requires personal monitoring ...”? Is this a “legal requirement”? – if so, where does it arise?

The scope of the Code is also very muddy: it is described as applying to “work and workplaces”, but there are extensive sections on exposure to members of the public, and management of waste, neither of which are relevant to exposure at work. For instance this Code requires (P 38), *inter alia*, detailed description of “heritage (social and cultural), and land use (present, potential and future)”. These issues have no place in a Code on workplace radiation protection.

## ***TREATMENT OF TECHNICAL ISSUES***

I have alluded above to the fact that this Code gives little indication that its author is conversant with radiation protection generally, or its application to mining. I will give just a few examples, although I could give many more: I note that Mr Tsurikov, who is a very experienced mine radiation consultant, gives over seventy. Firstly on the fundamental principles of radiation protection as recommended by ICRP, and adopted worldwide, including in RPS 9. The three principles are summarised (correctly) as “justification, optimisation and limitation”, but then Section 3.1 of this Code adopts an entirely idiosyncratic interpretation, where “justification” is equated with “eliminate the risks”, “optimisation” with “minimise through engineering controls” and “limitation” equated with “administrative controls”. This conflates two quite different concepts – the basic principles of radiation protection, and methods of achieving those aims (e.g. engineering and administrative controls). This is a complete distortion (or misunderstanding) of basic radiation protection fundamentals.

At the other end of the spectrum, page 21 states: “Never store specimens, even the smallest of size, in an inhabited room.” Perhaps trivial, but it underlines the lack of familiarity with radiation in mining. An underground miner spends most of his working hours in a “room” the walls, floor and ceiling of which may contain many thousands of tonnes of ore. To then tell a geologist, for example, that she cannot keep “even the smallest size” mineral sample in her office is risible.

My third example is on monitoring of drill cores. P 20: "Gamma radiation does not generally require any active control measures as it can be monitored with a survey meter". Obviously ease of monitoring does not imply that no control is needed. Then P 21: "The general external dose rate should be measured in the area and used to calculate doses in order to keep personal doses as low as practicable." Obviously again, simply measuring dose rates and calculating doses will not of itself keep doses low. But in addition, on P 20 it is (twice!) stated that workers in the area should wear monitoring badges to enable their doses to be assessed. So what is required – dose rate (area) monitoring or badges, or both, and why?

Finally, also on drill cores: This Code specifies that they should be stored not only on a concrete floor, but one that is sealed and painted, and with a roof! If there can be any justification for such a belt and braces approach, it is certainly not in workplace radiation protection. One wonders if the author has ever seen a mine corefarm. One also wonders why an ore stockpile of perhaps hundreds of thousands of tonnes can be placed on a crushed rock pad in the open air, while a few hundred tonnes of core require a sealed and painted concrete floor, and a roof!.

## ***Conclusions***

The few examples discussed above indicate that there are significant problems with both the overall purpose and scope of this Code, and its technical content. I believe that these are serious enough to require that the Code be completely rewritten.

If the current Code (RPS 9) has deficiencies that mean that a program approved under that Code is unacceptable under the new requirements, then it should be clearly stated what is unacceptable, why, and what additional requirements are needed. This Code does not do that. Instead it attempts, unsuccessfully, to give advice on what the industry already knows: how to prepare a mine radiation management program.

## ***Recommendations***

This Code should be withdrawn from public comment, and before being resubmitted:

- There must be proper consultation with the industry, and particularly with those already using the RPS 9 Code, with particular consideration to the integration of these requirements with those of RPS 9;
- This Code must properly address the differences between the radiation management plans that it requires and those of RPS 9, and any additional requirements that it may impose;
- Detailed technical editing by a person with expertise in radiation protection in mining must be undertaken; and
- Most if not all of the discussion of requirements for a radiation management plan to comply with RPS 9 should be removed from this Code.

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