

Comments on the CNSC Workshop Dis-12-02

Rio Tinto Comments: Rio Tinto welcomed the opportunity to comment on the CNSC workshop on DIS-12-02. To assist in comment Rio Tinto has provided the comments under the initial section discussion tab rather than on each individual subsection as the subsections are so related that there would be unnecessary duplication otherwise. Rio Tinto also provided an initial overview of the CNSC introductory statements as these were deemed critical in the understanding of the underlying philosophy of the Discussion Paper and did clarify some of the concerns.

Topic Areas and discussion summaries (including discussion of the CNSC opening remarks and explanations)

Rio Tinto welcomed the opportunity to contribute to the workshop and the number of participants (particularly from the uranium mining industry) highlighted the importance of the discussion paper. During the introduction, CNSC highlighted a number of misconceptions which industry had about the discussion paper and these should be addressed in any document arising from the workshop and subsequent papers arising. In particular, CNSC stated that:

- Although the scope of the document was to include uranium mining, the dose constraints proposed were based on power plant data and were not necessarily appropriate for uranium mines and other uranium facilities.
- The potential doses from rehabilitated facilities (particularly uranium mines and other fuel cycle facilities) was not considered in the discussion paper and as such would not be covered by any future documents arising from the paper.
- One of the main purposes of the discussion paper was to address an apparent large gap between where the legislative limits are set and where a facility was operating. The proposed approach was to set new “limits” based on a combination of dose and technology to close the gap. This approach was almost universally of concern to industry, raised questions on the use of the term “limit” and this was a major theme of the subsequent discussions.

This last point was the source of discussion prior to the formal split into four working groups so comments on the discussion are included here. The inappropriate use of the term “limit” is of high importance to the radiation protection profession at this time. The difficulties occurring with the return of people to regions of Fukushima has highlighted this problem with any change in “limit” being extremely difficult to communicate to the public and this has been a source of suffering and distress to the population. In the context of the discussion paper, having a new release “limit” being set so far below the actual dose limit is extremely difficult to communicate and will result in public concern and confusion over what is safe. The industry believes that the current gap between what is regarded as “safe” in the radiological senses and what is currently being released reflects an extremely effective system of control (by both industry and regulator) which has driven doses in the spirit of ALARA. In fact, it could be argued that the low doses current to the public (as endorsed by CNSC) are a direct result of industry’s desire to remain operating well below the perceived level of

safety and setting new “limits” may actually have an adverse effect on doses and industry’s desire to utilise new release mitigation technology.

The overall feeling of the workshop was that there should be a clear separation of what are the actual limits (based on radiological safety) and where the industry operates. This separation reflects many different approaches as per the “defence in depth” philosophy and, as such, lumping them all together into a new “limit” is both counterproductive and not required. Better communication of the controls which exist in the “gap” would be the first approach and reflects the strong relationship between the regulator and industry. In this “gap” is a whole range of regulatory limits including dose constraints, discharge levels, action points, ALARA practices, industry/regulator communication and industry conservatism. All these drive the low doses and are all designed never to approach what is regarded as the true limit. The “gap” between the limit and actual discharges are actually a great example of industry/regulator interactions and a description of why this gap exists and is a good thing is far more preferable than just setting a new extremely low “limit” which is not based at all on safety, is inappropriate and will only increase public confusion and concern.

1. *TBRL – BATEA – Pollution prevention*

The major findings of this discussion were strong industry concerns about combining technology and dose related approaches into one new “limit”. The CNSC summary of discussion (1.4) reflects this concern and the desire to separate limitation from optimisation as per ICRP recommendations. The statement of “risk” vs “performance improvement” is very pertinent and better communication on defence in depth and the degree of work that both CNSC and industry do in the gap zone is preferable to applying new limits, which may potentially only increase public concern and decrease the public confidence in both regulator and industry. Fukushima is currently showing the difficulties in trying to alter the public’s perception of a “limit” and, in the radiological sense, limit should only be applied to exposure based criteria.

2. *Exposure-based release limits and mixing zones*

Rio Tinto strongly supports the use of EBRL as the appropriate tool for regulating releases and ensuring public and environmental safety from facilities. However, care should always be used when apply the term “limit” and this needs to be a clear reflection of what is intended and the underlying assumptions in the final EBRL.

The use of mixing zones resulted in some degree of concern about the different Canadian and other jurisdiction’s regulatory approaches. Rio Tinto is firmly of the belief that you need to consider the site specific factors for each individual site to appropriately address the risk. This approach is based on operating major facilities in virtually all areas on the planet with the resulting diversity in climate, social, geological, hydrogeological and political factors. The consideration of mixing zone is vital to allow true determination of both risk and impact and Rio Tinto supports the need to include mixing zones in the determination of impact. However, the mixing zones need to be based on site specific factors rather than generic approach which may not apply to a specific site.

3. Release Limits and Dose to the Public

Rio Tinto strongly agrees with the CNSC workshop finding that the dose limit is the key to public acceptance and any apparent new “limit” would cause confusion and concern. In Rio Tinto’s opinion it was very obvious the proposed dose constraints were in no way in line with international recommendations (or constraints in other jurisdictions). The dose constraints were also not appropriate for mining activities (and potentially other fuel cycle activities) but CNSC did clarify that this was not the intention and the proposed values were based on reactor facilities (though this should have been included in the workshop notes). The importance of terminology was a recurring theme of the workshop and this is reflected in the summary of discussions. Rio Tinto believes that dose constraints should consider site specific factors rather than just taking a generic value. This reflects both the diversity of type of operations as well as the variety of site specific factors. This is very apparent in the mining industry where variations in the type of operation can give rise to very different emission characteristics (based on physical processes rather than any technological process). It was also firmly stressed by Rio Tinto that inappropriate use of dose constraints could adversely affect the relative competitiveness of the Canadian industry.

4. Action Levels for Environmental Protection

Rio Tinto had strong concerns over the statistical approach being proposed and this does not appear to be adequately reflected in the summary of discussions. In particular the use of a 95% CI is a very simplistic approach which does not necessarily reflect the real world and could give rise to an inappropriate level of reporting and concern based around “false positives”. For clarification, statistically, the 95%CI is based on the level being exceeded 5 times in 100 readings (i.e. the mid-point of the number of exceedances is 5). If the approach taken is that after five exceedances the CNSC will action the exceedance, this effectively means that in a period of 100 readings there is actually a high probability that this criteria will be exceeded (5 is the mean number of exceedances but this is normally distributed and, as such, could be 4 or 6 with equal probability).

The other major concern is that the application of a statistical approach is only valid under very specific conditions. Critically, there needs to be a very strong knowledge of the nature of the probability distribution in applying the approach. At its simplest, this is knowledge of how the distribution is formed (is it normal, log-normal or some other distribution). However, the probability distribution is often not simple and can be made from the superposition of multiple different distributions giving rise to a complex system for which the 95% CI approach would not work. A simple example could be measuring conductivity in a stream. Under normal flow conditions the sensor may give a certain distribution which approaches a normal distribution. However if the stream flow decreases or stops the distribution would be markedly different and this would not be within the normal flow probability distribution. This becomes even more important following the initial thawing of the stream and the resulting “first flush” flow and resulting conductivity distribution. During these times a totally different distribution is realised and it would be totally inappropriate to apply the normal distribution under these conditions. The essence of this is that although the statistical approach may be valid in some cases (but not at the 95% CI) it should only be applied very carefully and when there is strong knowledge of the underlying probability distribution.

A. Comments on Appendix A: Acronyms

No major comment on the acronyms beyond the importance and difficulty in defining what are limits, constraints, levels, values, etc.). This is currently of critical importance to the radiation protection profession and this is a source of concern for organisations such as ICRP and IAEA in the aftermath of Fukushima.

B. Comments on Appendix B: Workshop Participants

No comment beyond the acknowledgement of the strong representation from the uranium mining industry which reflected the concerns over the applicability and inappropriateness of the discussion paper to this aspect of the nuclear fuel cycle.

C. Comments on Appendix C: Mixing Zones

No Comment

D. Comments on Appendix D : Flip Charts

No Comment

- 4.1 TBRL – BATEA – Pollution prevention
- 4.2 Exposure-based release limits and mixing zones
- 4.3 Release Limits and Dose to the Public
- 4.4 Action Levels for Environmental Protection