Submission to New Zealand Environmental Protection Authority

Te Mana Rauhī Taiao

Risk Assessment Methodology for Hazardous Substances – Consultation draft

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Introduction

Chris Lee-Steere (Australian Environment Agency Pty Ltd) has had a working relationship with the New Zealand EPA for many years. This has included peer reviewing EPA environmental assessments in-house assessment worksheets, and undertaking full environmental assessments for new and existing hazardous substances following New Zealand methodology.

This submission is provided in response, particularly, to the environmental risk assessment methodology described in Appendix C of the Risk Assessment Methodology for Hazardous Substances – Draft for Consultation.

Section 3.3.1 – Quantitative models used by the EPA

The document states:

> To make it easier to assess the risks from hazardous substances, where possible we use quantitative models that are scientifically robust, easy to use, publicly available, and have been validated or used by other regulators.

This is not always the case and discussion is provided below on GENEEC and the RexTox models and their application in aquatic exposure assessment.

Table 8 – Alternative assessment terms:

The environment assessment is determined either by a risk quotient (effects/toxicity), or its inverse, the TER (toxicity/exposure). Table 8 refers to this as the "Tolerable exposure ratio", but it should be the "Toxicity Exposure Ratio" (TER).

Comments on Appendix C – Environmental Risk Assessments

Section C.1 – "tolerable exposure ratios" should be "toxicity exposure ratios".

Section C.2 – Aquatic risk assessment (combined spray drift and run-off)

The model used by NZ EPA is GENEEC2 with justifications provided. They include it being a simple, conservative screening model and being freely available.

The US EPA no longer supports GENEEC. It was superseded many years ago by the Surface Water Concentration Model (SWCC), which has in turn been replaced by the "Pesticide in Water Calculator". The executable code for GENEEC is not easy to obtain, and when it is obtained, is not supported on contemporary computers. Further, the underlying algorithms are not available, so assessors and registrants cannot reproduce the output.

The GENEEC output defaults to a 2 m water body, which is much deeper than the NZ default preference of 30 cm. The depth can't be changed in GENEEC. This means, there could be many cases where a screening assessment passes, but if the lower 30 cm water body were applied, the screen

would fail. Further, failure at the screening level results in a higher tier assessment where conditions are actually made more conservative (a move from 2 m to 30 cm).

The output from GENEEC is not user friendly and requires conversion of application rate to be in terms of lb/A, which increases potential for human error.

The document (C.2.8) states the EPA considered alternative options including the EU FOCUS model. Reasons that this was not adopted include:

> consideration of more parameters than GENEEC including the time of year a substance is used along with accounting for how changing concentrations affect partitioning. The FOCUS models can also identify if elevated predicted concentrations are due to spray drift or runoff, however, it has not been possible to select a single climatic scenario in FOCUS that is applicable to all New Zealand, particularly with the rainfall extremes within a small geographical area. **The model can also take days to a week to run which is not compatible with the EPA operating within tight statutory deadlines.**

These are puzzling comments. FOCUS Step 1 calculations only require inputs with respect to application rate, crop type, number of applications, spray interval, solubility, Koc and water/sediment DT50. This is less onerous than the input values required for GENEEC. The Step 1 calculations have a default 10% runoff and there is the ability to also adopt a default spray drift value (2.77% would be appropriate to stay in line with the default drift factor for non-target arthropod assessments). It is noted the NZ EPA default for a screening runoff assessment (Table C.7) is for 5% runoff and this could easily be incorporated in the FOCUS Step 1 algorithms.

At this level of assessment, there is no requirement to identify climatic scenarios and there is a user friendly on-line version of the calculator available and the calculations are performed instantaneously. More importantly, the algorithms are easily available and transparent, so users can generate their own output with confidence.

Section C.3 and C.4 – Aquatic environment (refined ground and aerial spray drift)

The methodology applies the AgDRIFT model (ground) and AgDISP model (air) adopting the Australian Pesticides and Veterinary Medicines Authority (APVMA) standard deposition curves from their 2010 policy.

Please note, the APVMA has updated its spray drift policy and the consultation period has ended. There are significant changes to the drift curves from the 2010 model. With respect to ground modelling, the AgDRIFT model is no longer relied on. AgDISP is being applied for ground application. The concerns about this in the EPA methodology document (model performed very poorly in a New Zealand validation study) are noted. The same concerns were raised in Australia and model runs were gradually developed so that they matched ground field studies as best as possible for a range of droplet sizes.

The finalised APVMA policy and updated spray drift curves are expected to be published in the near future.

Section C.5 Aquatic environment (refined runoff)

The methodology is to apply an adapted sub-model of the OECD's RexTox model and states this was validated by Probst et al (2005). The validation undertaken by Probst related to the in-stream component more so than the edge of field component, which is what the RexTox model was developed for. Unfortunately, the adaptation applied in the methodology document appears to be based on the Australian Department of Environment and Energy use of this model, where they assumed a Q/P of 0.2 based on a default 100 mm rainfall value and a 20 mm runoff value. There was no scientific consideration of these values and the basis for their use was not clear. The APVMA has moved away from this default, and while the OECD approach remains the same, the Q/P is now based on runoff curves developed for different soil types and cropping situations in Australian agriculture.

In this regard, the OECD workshop underpinning the RexTox model discussion provides look up table for a number of situations (loamy and sandy soils, bare or covered soils, moist or dry soils) that still allow a more robust determination of Q/P. The choice used by the Australian department tends to underestimate aquatic exposure and is not robust.

Despite that, if the shortcomings of Q/P can be addressed, the method is useful for national regulatory schemes in that it only requires a small number of input values so does not rely a large number of default values.

Section C.6 – Sediment organisms

Table C.9 provides a default suspended matter-water partitioning coefficient of 5.65 m^3/m^3. This is referenced to EC (2003), which is the technical guidance document (Part IV) in the reference list. Part IV of the Technical Guidance Document provides the different emission scenario documents and Kp(susp-water) is not addressed in that document.

Part II of the Technical Guidance Document (https://echa.europa.eu/documents/10162/16960216/tgdpart2_2ed_en.pdf) describes how the suspended matter-water partitioning coefficient is calculated but does not provide a default value. It can't, because the partition coefficient is dependent on the chemical properties, particularly, the Kd or Koc. As this differs between chemicals, it is difficult to see how a meaningful default value could be applied here.

Section C.7.3 – Assumptions and uncertainties with respect to modelling soil exposure to soil organisms

The document states:

> The half-life (DT50) value in soil needs to be from laboratory tests conducted at 10 to 20ºC and a pH of 5 to 9. When there are DT50 values of several soils available, typically the GENEEC2 formula are used to determine the relevant DT50 for modelling purposes.

It is unclear what the GENEEC2 formula is here as they are not available. GENEEC is a water model and requires a single half-life value to be applied.

The document further states:

> For the off-field calculations, the 90th percentile of the spray drift values from the BBA model for ground-based booms and AgDISP for aerial applications are used.

It is unclear why the BBA curves are applied for terrestrial assessment (ground based), but the AgDRIFT model is applied for aquatic assessment.

Section C.8 – Non-target plants

The document states:

> The spray drift models produced by the BBA for the exposure assessment of aquatic organisms are used as a surrogate for the exposure of terrestrial plants.

BBA drift curves are not referenced in the EPA methodology document for exposure calculations to aquatic organisms, rather, the AgDRIFT model is stated as the model of choice for ground application.

It is confusing when different models are applied for the same purpose, that is, to predict downwind drift deposition. Further, if only the BBA curves are used for non-target plants, does this mean exposure to them is not considered in the event of aerial application?

It is noted again here that the APVMA spray drift curves are being updated and expected to be ready shortly. The BBA curves are applied for orchard uses but otherwise, standard curves for ground and air have been re-developed from the 2010 policy using AgDISP v8.26.