BEFORE THE HEARINGS PANEL APPOINTED BY CANTERBURY REGIONAL COUNCIL

UNDER the Resource Management Act 1991 (RMA)

AND

IN THE MATTER of an application by Canterbury Regional Council

for resouce consent to discharge agrichemicals to rivers and their connected waterbodies, air and the coastal marine area, and the clearance of vegetation, for the purposes of weed management to provide flood, erosion, drainage and river enhancement works.

STATEMENT OF EVIDENCE OF DAVID GILL ON BEHALF OF CANTERBURY REGIONAL COUNCIL (APPLICANT)

3 March 2023

SUMMARY STATEMENT

1 I am an Independent Chemical Consultant, with decades of experience working with and advising on agrichemical use.

2 I have reviewed the applicants use of glyphosate and triclopyr and consider these to be the best available agrichemicals available to their require task. This position should be reassessed routinely.

Introduction

3 My full name is David Gill. I am Director and owner of Independent Chemical Consultancy Limited. I have held this position since 2000.

4 I have been asked to undertake a review of the agrichemicals they are currently using to manage weeds within and near waterways and provide advice on whether they are the best agrichemicals to be using for the intended task.

Qualifications and Experience

5 I have been involved in using/advising on the use of agrichemicals for 44 years. My initial experience was 14 years with BASF Agricultural Solutions and prior to that with PGG Wrightson as Arable Rep and have been in my current role as a consultant agronomist for 24 years.

6 I am the owner and director Independent Chemical Consultancy Limited. Key component of this role include:

(a) Maintaining regular contact with many chemical supply companies to understand what products are commercially available. Note that I advise independently to each company, and do not receive commission based on product recommendations.

(b) Understanding of general farming activities and the use of agrichemicals, and other chemicals, to enhance production.

(c) Providing independent advice to farmers on which chemicals would enhance production, including the control of weeds.

7 While I primarily provide chemical advice to farmers, the applicants requirements are niche, and I consider my knowledge of chemical-based weed-control is directly relevant.

8 I regularly observe spraying operations and return to observe how successful they have been.

Code of Conduct

9 I can confirm that I have read and am familiar with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. I have complied with the Code of Conduct in preparing this evidence and I agree to comply with it while giving any oral evidence during this hearing. Except where I state that I am relying on the evidence of another person, my evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

10 Although I have been contracted by the applicant, I am conscious that in giving evidence in an expert capacity that my overriding duty is to the Hearings Panel.

Scope of evidence

11 I have been asked to provide evidence on behalf of the applicant to inform resource consent applications to discharge agrichemicals and clear vegetation.

12 My evidence relates to the selection of agrichemicals being used to control vegetation in, and near rivers. I provide my advice on:

(a) A review of the use of Glyphosate and Triclopyr

(b) Consideration of other potential agrichemicals

(c) Use of adjuvants

(d) Comments on timing and delivery

(e) Recommended controls

13 I provided the applicant initial advice in June 2021. In preparing this evidence I revisited that previous advice and reviewed that it was still relevant and for any required updates.

Introduction

14 Environment Canterbury (Ecan) is responsible for the maintenance of rivers & waterways in the Canterbury region. The Rivers Section at ECan is responsible for managing over 2000 km of rivers (including 1601km of managed river berm and 647km of Stop banks) and 671 km of drains flood conveyance/flood and erosion control and land drainage.

15 Part of the maintenance requires ECan to control unwanted vegetation along riverbanks, stopbanks and tracks, fairways and drainage networks to ensure that water flows are maintained and rivers and flood protection assets are effective in times of

excessive rainfall and floods. They have provided a list of current target weed species under section 3.3 (page 17) of their AEE. These include willow, broom, gorse, bramble, Old Mans Beard, ivy, lupin, monkey musk, watercress.

16 The most economic way of controlling this unwanted vegetation is the application of herbicides. Currently the Rivers Section use glyphosate, triclopyr and occasionally diquat. These products are the only active ingredients covered by the previous consents. Although allowed by the consents, Ecan avoid using Diquat.

17 Ecan are responsible to ensure the products they are using are appropriate for the job specified. Regular appraising of current operations to see if there are other options that could be effective in vegetation control is good practice.

18 Agronomy is a branch of agriculture that deals with crop protection and soil management. A key component of crop protection is the management of weeds and as such, an appropriate profession to provide advice on successful agrichemicals use.

19 The NZ Novachem Agrichemical Manual is an independent, comprehensive, and easy to use manual that outlines the various agrichemicals commercially available in New Zealand. For each chemical it lists a product brief, precautions, recommended uses and concentrations for various discharge methods and target species. Whilst the label is the official document, the manual is an industry accepted core resource when advising on agrichemical use.

Review of Glyphosate and Triclopyr

20 The two main herbicides ECan are using, glyphosate and triclopyr, I reviewed whether these are appropriate agrichemicals for the required task.

21 It is my opinion that these products are the best available agrichemicals for the management of weeds as required by ECan and I recommend that any replacement consent authorises the use of both glyphosate and triclopyr.

22 Glyphosate is a non-selective / broad-spectrum herbicide, meaning it will kill most plants. There are some (not all) formulations of glyphosate that have been approved for use in and near water, indicating its suitability for general weed control in and near water.

23 Glyphosate has been in the New Zealand market since the 1970s and is perhaps the most common weedkiller used[1]. In my experience it is extensively used throughout most farming operations.

24 I acknowledge recent public interest, and the EPA's 'Call for information' on the use of glyphosate. It is the EPA's role to decide whether a reassessment on the use of

glyphosate is required, and in the meantime, EPA still states that glyphosate is safe to use and continues to be authorised in New Zealand. Should there be any changes to the approvals for glyphosate use, ECan may need to identify new agrichemicals for weed control.

25 Triclopyr is a selective herbicide used to kill woody plants and broadleaf weeds including nettles, docks, and brambles. Grasses and sedges tend to be les sensitive to triclopyr than other weeds. Triclopyr is therefore the recommended agrichemical when wanting to kill only selected plants, such as broadleaf and woody weeds growing on stopbanks, whilst ensuring that the even grass cover is not killed. Triclopyr can be more effective than glyphosate on some woody species and can be added to fairway spraying where woody weeds, especially gorse, are hardened and not abled to be killed by glyphosate. Triclopyr is not approved to be discharged to water, so care should be taken to ensure appropriate setbacks are used to prevent a discharge to water.

26 Triclopyr was first registered in New Zealand in 2007[1] and in my experience is used primarily for brushweed control as it is most effective product available.

27 ECan asked specifically about the availability of the amine formulation of triclopyr. My reading of available trial conclusions is that the amine formulation is less toxic to fish species. Through my enquiries with the industry, I found that this product is not currently commercially available in New Zealand. There is potential of one company to supply this product, subject to EPA registration. As to the question as to why amine formulation is not available, comes down to size of the market and generally amines are more expensive to produce (these products are used in thistle control which is a very price sensitive market). I am unable to specifically comment on the potential price difference between ester and amine formulations of triclopyr.

28 I was also asked to comment on whether increased concentrations of glyphosate, using glyphosate with particular adjuvants, or increased applications of glyphosate could be used as an alternative to using triclopyr in riverbeds but achieving the same result. Triclopyr use in riverbeds is to target gorse and other woody and hardened weeds later in the season. A benefit of using triclopyr is to only kill selected plants and can leave some grass cover. This reduces the re-infestation of the targeted gorse and other woody weeds. Whereas, when a broad-spectrum agrichemical, like glyphosate is used, fast growing weeds can re-establish quickly.

29 ECan are no longer seeking consent for the discharge of diquat, so I have not specifically addressed this agrichemical in this report.

1, reference www.epa.govt.nz

Potential alternative agrichemicals

30 I contacted various agricultural chemical companies to get updates on availability and likely availability of new products that maybe of interest in this area. From those discussions, I can confirm there are no other agrichemicals on the market that I would suggest as being better alternatives than glyphosate and triclopyr for the required outcomes.

31 There seems to be few new active ingredients coming onto the market in the next few years. There is an increase in conditions by Environmental Protection Agency of new products coming onto the market with respect to how close they can be applied to waterways. These types of restrictions are likely to severely limit the availability of new active ingredients that can be used in and around waterways.

32 Current alternative chemicals are by far more expensive and not as effective, or some may be cost effective, but have significant residual properties (long half-life leading to prolonged presence in the soil), ie. Metsulfuron-methyl.

33 I am aware of two companies (Corteva and Bayer) that may be looking to register/import alternative agrichemicals in the next 2-4 years. The details of those agrichemicals have not been shared with me due to commercially sensitivity.

34 I recommend that ECan regularly review the agrichemicals being used with an agronomist and check whether new, improved options have become available.

Use of adjuvant

35 The current (expiring) consents currently allow the use of “surfactants”. I recommend that the term “adjuvants” should be used.

36 Adjuvants are materials added to agrichemicals to enhance the efficacy of active ingredients and improve the overall performance of the product (activator adjuvants) or special-purpose adjuvants which includes drift suppressants etc. Adjuvants may be incorporated into the purchase product formulation (built-in) or they may be added to the tank prior to spraying (tank mix-adjuvants). Examples of adjuvants types include:

- Surfactants (surface acting agents) – activator agents that enhance performance by increasing surface contact, reduce runoff and increase leaf penetration. These can be spreaders, stickers, emulsifiers, or wetting agents that help agrichemicals stay in contact with the leaf longer and increase penetration into the plant cell.

- Oils– and activator agent that slows the drying time to increase the absorption of agrichemicals and can improve the penetration into the leaves by reducing surface tension.
- Anti-foaming agents – added to the spray tank to control or reduce the formation of foam in the tank during mixing.
- Drift retardants – bind water molecules together to form larger spray droplets to reduce drift.

37 Adjuvants themselves have varying risk of environmental impact Some adjuvants will have EPA approvals / safety sheets (ie organosilicone), others do not need to be approved by EPA (ie spray oils) because they do not meet the thresholds to be classified as hazardous substances.

38 Adjuvants will list any EPA or manufacturer requirements on their labels. I recommend that any adjuvant use is done so in accordance with their labels.

Comments on timing and delivery methods

39 Weeds that are actively growing are more likely to be impacted by herbicides, therefore spraying during the active growth phases is likely to achieve the best results. Another benefit of spraying weeds early in the growth season is to kill them before they have set seed. The growth season typically starts in Spring. I appreciate that the timing of ECan's spray programme is a balance of many competing factors and spring spraying is not always possible.

40 I understand some spraying occurs during autumn when the plants will have less active growth and the new season growth will be hardening off. Due to that, glyphosate may no longer be a successful herbicide and triclopyr may be the best option

41 I see benefit in exploring the increased use of targeted spraying by using drones, rather than whole river spraying. Drones may soon carry technology capable of identifying and spraying only weed/target species and spraying by GPS and/or camera. Drones offer a reduction in off-target application and are likely to play an increasing role in targeted weed control through public pressure or changes to legislation.

42 Examples of successful drone use for agrichemical spraying includes some wilding pine control, use within apple orchards, on both Ashburton and Hinds River and drainage areas, and extensively on fodder crops.

Recommended controls on replacement consents

43 Whilst assessing the appropriateness of the agrichemicals used, I also reviewed the Condition's on the expiring Consents. Relevant to my assessment, I recommend the ongoing inclusion of the following conditions:

(a) Application rate and concentration of herbicides and adjuvants shall not exceed the manufactures recommended rate

(b) All HSNO approvals for substance must be adhered to

(c) Herbicide must be discharged in a manner that complies with the NZ Standard 8409 (current version)

Conclusions

44 The two main herbicides Ecan are using, glyphosate and triclopyr, are suitable for the control of target weeds in rivers and waterways.

45 The current consent allows for the use of "surfactants", I suggest this needs to be amended to say "adjuvants" (ensuring they are appropriate ie reduce drift, enhance herbicidal activity and have limited environmental impact)

46 Ecan should regularly review the agrichemicals they are using and seek the advice of agronomists for any products new to the market.

Dated 11 March 2024

David J GILL

Consultant Agronomist

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David Gill