

Evaluation and Review Report

Application for the Reassessment of a Hazardous
Substance under Section 63 of the Hazardous
Substances and New Organisms Act 1996

Name of Substance(s): Sodium Fluoroacetate
(1080) and Substances Containing 1080

Application Number: HRE05002

**Prepared for the
Environmental Risk Management Authority**

April 2007

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Summary

This application for the reassessment of 1080 is a complex application with a complex set of issues associated with it. The Evaluation and Review (E&R) Report sets out the significant issues, including the significant adverse and beneficial effects that have been identified and the uncertainties associated with those effects.

One challenge for the applicants has been to identify and describe suitable alternative scenarios to the use of 1080. It has not been possible, and it is probably not reasonable, to expect a comprehensive comparative risk and benefit analysis of 1080 with alternatives. The application has proposed a 'without 1080' scenario where the increased use of trapping and cyanide is the alternative. While other alternative scenarios can be envisaged and are briefly discussed, most of the evaluation has been undertaken with reference to the applicants' 'without 1080' alternative.

The application is for the reassessment of a number of substances containing 1080. These have usually been specifically designed to be used in certain situations. Unless otherwise specified, however, they are referred to in this report as 1080.

1080 is a highly hazardous substance, with its toxicity to vertebrates the property that makes it suitable for pest control. While the application has data on many of the hazardous properties of 1080 there are some gaps, especially on the properties that might cause chronic environmental and health effects. The Agency¹ concludes that while these data would have enabled a more complete assessment of effects there was sufficient information provided to undertake an adequate assessment of the risks, costs and benefits.

1080 has been used in New Zealand, mainly for vertebrate pest control, since 1964. Over that time, there have been changes to the way it is used, which is one of the primary reasons for this reassessment application.

The applicants, the Department of Conservation and New Zealand Animal Health Board, are the major users of 1080. They use it as a tool to achieve broader outcomes along with other tools, including the use of other chemical agents. The application has provided considerable information to support the use of 1080. In evaluating this information, the Agency has also identified some gaps and uncertainties in the information, and has attempted to address these gaps and uncertainties by conducting its own research and requesting further information from the applicants. Where the gaps and uncertainties remain, the impact is discussed in the relevant sections of this report.

¹ The **Agency** is the executive arm of the Environmental Risk Management Authority (ERMA New Zealand) which provides support to the Authority (see section 1.2).

There is an established industry using 1080 in New Zealand, especially for the importation, formulation, distribution and application of 1080 and products containing it, as well as the research and training activities that support it. Many of the industry participants have been using 1080 for many years, indicating that there is a relatively high level of knowledge about these substances.

There is also an established regulatory regime, with the primary regulation of 1080 covered by the Hazardous Substances and New Organisms Act 1996 (HSNO Act), and other legislation such as the Agricultural Compounds and Veterinary Medicines Act 1997 and the Resource Management Act 1991. Thus central, regional and local government are all heavily involved in both the use and the regulation and control of 1080.

There is a widespread view in New Zealand that possums, and other vertebrate pests, need to be actively controlled. There is also a widespread range of views in New Zealand over the part 1080 should play in controlling these pests. The views of submitters on this application range from one end of the spectrum to the other, and as a result, there has been considerable debate. The issue of aerial application of 1080 engenders the greatest debate.

The E&R Report identifies that many, but not all, of the significant risks and benefits arise from the aerial application of 1080. The assessment of these risks and benefits also includes an assessment of the information gaps and uncertainties the Agency has identified that are associated with them.

The most significant adverse environmental effects from the use of 1080 are the potential impacts on native birds. For the 'without 1080' scenario (cyanide and trapping) the most significant adverse effects are on ground-foraging birds, including weka.

However, the beneficial effects on native flora and fauna from the use of 1080 are considerable and there is little uncertainty about their realisation. Although individual non-target organisms are sometimes killed by 1080, the reduction in numbers of pest species is such that populations of these (and other) non-target species benefit overall. The benefits of cyanide and trapping are less, as it is more difficult to treat large areas of inhospitable and inaccessible terrain and cyanide baits are not intended for the management of pest species other than possums.

The levels of adverse effects on human health and safety from 1080 and from cyanide are similar. The major adverse effects on human health of 1080 may be reproductive effects (reduced fertility) and target organ toxic effects on the heart for people manufacturing baits and spraying and loading baits for aerial operations. With respect to acute toxicity, cyanide baits are more toxic than 1080 baits, but given the degree of control in place, and that ground laying of cyanide is likely to result in better control of the distribution of the baits, the acute health risks for the public were assessed as essentially the same.

Iwi/Māori organisations recognised the benefits to native and valued species from effective pest-management strategies, and some noted the economic value of the continued use of 1080 (particularly aerial application) for the agricultural and forestry sector, in which iwi/Māori are significant participants.

Consultees and submitters expressed their desire to be more involved in the regional management of pest control generally, and in the use and management of 1080 in particular. Frustration was expressed about the overall lack of value or recognition given to mātauranga and tikanga Māori when considering pest-management strategies.

In terms of society and communities, the major adverse effects are the loss of opportunity to hunt due to reduced deer populations, and concern for the welfare of non-target animals exposed to vertebrate pest-control methods. The main beneficial effect is reduced stress to farming communities resulting from less concern about the impact of bovine Tb. Submitters raised concerns about perceptions of native ecosystem degradation for both the ‘with 1080’ and ‘without 1080’ scenarios.

The major effects on the market economy from the use of 1080 are reduced costs to farmers from disease and vector control. Other significant effects are the removal or relaxation of movement control, and the economic effects of reduced grazing competition, however, the assessment of these effects is subject to considerable uncertainty.

Aerial application of 1080 is identified as the least cost option for killing possums. While the cost per hectare of other methods may not appear to be significantly different, a cost differential of \$5–10 per hectare is a considerable amount when the areas currently treated (about 600,000 ha) annually are considered.

As mentioned above, the Agency notes that the most significant issue arising from the application is the management of the adverse effects arising from the aerial application of 1080 and this report proposes controls that can be used to manage the risks. The controls build on those currently used and proposals for additional controls which include establishing an acceptable daily exposure (ADE) level and formalising existing “best practice” in the aerial application of 1080.

The proposed controls retain the current aerial application rate of 30g 1080/ha but the report notes that this rate may be able to be further reduced. There is discussion on other issues including several aspects of bait construction such as bait size and quality and the use of ingredients that act as repellents and attractants or lures without proposing any specific controls.

The conclusions and recommendations (section 11) propose ways these issues may be addressed.

The Agency notes that some of the adverse effects associated with the use of 1080 can be addressed through the recommendations, while others require further investigation and discussion to determine the most appropriate management options.

The Agency notes that risks are most effectively managed when there is a high degree of compliance with controls. It also notes that 1080 is widely used in areas where New Zealanders undertake a number of recreational activities and that many New Zealanders, including Māori, have strong views on the integrity of New Zealand's natural ecosystem. Therefore, it notes that increased consultation and partnership with relevant communities will enhance the compliance with controls and, if the reassessment application is approved, result in more effective management of risks and realisation of benefits.

As evidenced by many of the consultations undertaken by the applicants and other parties, and by many of the submissions received on the application, there is wide recognition in New Zealand that 1080 and other vertebrate poisons are probably necessary at this time. However, along with this there is also recognition that their continued use should be closely monitored, and alternative technologies should continue to be actively explored and implemented when possible.

1 Introduction

1.1 Application details

Application code	HRE05002
Application type	Application for the reassessment of a hazardous substance under section 63 of the Hazardous Substances and New Organisms Act 1996 (HSNO Act)
Applicants	Animal Health Board (AHB) and Department of Conservation (DoC)
Date application received	18 October 2006
Submission period	2 November 2006 to 31 January 2007
To be considered by	A committee of the Environmental Risk Management Authority (the Committee)
Purpose of the application	Reassessment of sodium fluoroacetate (1080) and substances containing 1080 (a vertebrate toxin). The applicants wish to continue to use 1080 for the control of possums, wallabies and rabbits, and for the targeted by-kill of rodents and mustelids (mainly stoats).

The application was lodged pursuant to section 63 of the HSNO Act (application for reassessment) and, as required under that section, deemed to be an application made under section 29 of the HSNO Act. As required under section 63, sections 29 and 54–61 of the Act apply.

1.2 Terminology

In this report, reference is made to the **Agency**, the **Authority**, the **Committee**.

- The **Agency** is the executive arm of the Environmental Risk Management Authority which provides support to the Authority.
- The **Authority** comprises eight members who are appointed by the Minister for the Environment. The powers, functions and duties of the Authority are set out in the HSNO Act. The Authority may delegate the power to hear and decide any applications made under Part V of the HSNO Act to a decision-making committee appointed under section 19 of the Act.
- The **Committee** refers to the decision-making committee to which the Authority has delegated the power to hear and decide the application for the reassessment of 1080.

1.3 Agency project team

The Evaluation and Review (E&R) Report was compiled by a project team made up of staff from the Agency with input from external experts contracted to provide advice on various aspects of the application.

The Agency's project team comprised the following members of staff:

Name	Title
Andrea Eng	General Manager Hazardous Substances
Janet Gough	Senior Policy Analyst
Sue Scobie	Senior Advisor Hazardous Substances
Jim Waters	Senior Advisor Hazardous Substances
Nicola Reeves	Advisor Hazardous Substances
Robin Toy	Manager Reassessments
Michael Morris	Manager Legal & Risk
Linda Robinson	General Manager Māori

This report was externally peer reviewed by Dr Abdul Moeed and reviewed and signed off by Dr Donald Hannah, General Manager Strategy & Analysis.

1.4 Additional information

As well as requesting further information from the applicants, additional information was requested from and supplied by:

- Dr Mark Fisher, Ethics and Animal Welfare, Kotare Bioethics (Appendix I)
- Professor Ross Cullen, Agricultural and Resource Economics, Professor of Resource Economics at Lincoln University (Appendix J)
- Stuart Ford, Agricultural Economics, The AgriBusiness Group (Appendix K)
- Dr Peter Fisk, Ecotoxicologist, Peter Fisk and Associates (attached to Appendix C).

The additional information in the form of reports received from these consultants is appended to this report.

2 Application Process

2.1 Background to the application

Sodium fluoroacetate (1080) was first assessed and registered for use in New Zealand in 1964 and subsequent registrations of products containing 1080 referenced the original data. Substances containing 1080 were transferred to the HSNO Act regime in November 2004 with essentially the same conditions that applied under previous legislation. 1080 and products containing 1080 are approved substances under the HSNO Act.

In March 2002, the Authority considered whether or not there were grounds for reassessing the approval for 1080 and substances containing 1080. The Authority decided that there were grounds for reassessment based on sections 62(2)(a) and 62(2)(c) of the HSNO Act, that is:

- significant new information relating to the effects of 1080 has become available (section 62(2)(a))
- there is information showing a significant change of use or a significant change in the quantity of 1080 manufactured or imported (section 62(2)(c)).

In reaching its decision, the Authority agreed that issues of public concern relating to the use of 1080 provided further grounds for reassessment.

In October 2006, the Animal Health Board (AHB) and the Department of Conservation (DoC) ('the applicants') submitted an application for the reassessment of 1080 and substances containing 1080. The applicants wish to continue to use 1080 for the control of possums, wallabies and rabbits and the targeted by-kill of rodents and mustelids (mainly stoats).

Table 2.1 sets out the key events leading up to this application for reassessment of 1080.

Table 2.1: Key events leading up to application for reassessment

Date	Key events
1964	Sodium fluoroacetate (1080) was first assessed and registered for use in New Zealand.
February 2002	The Animal Health Board made an application for a decision on whether there were grounds for reassessment of 1080 and substances containing 1080.
March 2002	<p>The application was considered on 5 March 2002 by the Hazardous Substances Standing Committee (the committee), represented by Professor Colin Mantell (chair), Professor George Clark and Tony Haggerty.</p> <p>The Committee decided there were grounds for reassessing 1080 and substances containing 1080.</p> <ul style="list-style-type: none">• New and significant information relating to occupational exposure, mutagenicity data, reproductive and developmental toxicity data, and ecotoxicity data had become available since 1080 was first registered in 1964.• A significant change in the quantity imported is proposed. <p>In addition, the Committee agreed that issues relating to public concern about the use of 1080 would best be addressed through the public participation process of reassessment.</p>

2.2 Timeline

1 November 2004	Vertebrate toxic agents were transferred to the Hazardous Substances and New Organisms Act 1996, with the exception of 1080. The Hazardous Substances Standing Committee of the Authority decided not to transfer 1080 because of the then imminence of the 1080 reassessment application.
1 July 2005	1080 was transferred to the Hazardous Substances and New Organisms Act 1996 in order to align the requirements for 1080 licensing with the requirements for the licensing of the remainder of the vertebrate toxic agents.
18 October 2006	The application for the reassessment of 1080 and substances containing 1080 was formally received.

2.2 Timeline

Table 2.2 sets out the timeline for this application for reassessment.

Table 2.2: Timeline for application for reassessment

Action	Date
Application formally received	18 October 2006
Application publicly notified	2 November 2006
Public submissions closed	31 January 2007
Evaluation and Review Report circulated	27 April 2007
Hearings scheduled	14–25 May 2007

2.2.1 Time limits and waivers

Under section 59 of the HSNO Act, the Committee waived the statutory time limits twice.

- The submission period was initially due to close on 14 December 2006. In response to several requests to provide submitters with additional time to prepare submissions, the Committee extended the submission period until 31 January 2007. This was publicly notified through a press release and publication in the four main daily newspapers and the *Waikato Daily Times* on 11 November 2006.
- The requirement to fix a hearing date within 30 days after the closing date for submissions was waived, pending finalisation of the Agency's review of this application. Hearings were subsequently scheduled for 14-25 May 2007.

2.3 Notification and consultation

2.3.1 Ministerial call-in

The Minister for the Environment was advised of the application on 1 November 2006 (section 53(4)(a) of the HSNO Act) and given the opportunity to 'call-in' the application under section 68 of the HNSO Act. This action was not initiated.

2.3.2 Agencies notified

In accordance with section 53(4)(b) of the HSNO Act, government departments and Crown entities (as listed in Appendix S) were advised of the application and given the opportunity to comment or make a submission.

Three government departments were identified as having a specific interest in the application and were provided with a copy of the application (excluding the confidential information (composition details on the 1080 formulations) but with the opportunity to access this if necessary). These government departments were the New Zealand Food Safety Authority (Agricultural Compounds and Veterinary Medicines Group), the Ministry of Health and the Department of Labour.

Other government departments and Crown agencies were provided with a copy of the application summary.

2.3.3 Public notification

The application summary was also sent to interested parties who had indicated that they wished to be notified of this type of application (listed in Appendix S).

In accordance with section 53 of the HSNO Act, the application was publicly notified on the ERMA New Zealand website and advertised in the *Dominion Post*, *New Zealand Herald*, *Christchurch Press*, *Otago Daily Times* and *Waikato Times* on 1 November 2006. The extension to the submission period was notified in the same five newspapers on 11 November 2006.

In addition, the Agency hosted a '1080 Generic Issues hui' for its Māori National Network on 2-3 November 2006. Feedback from this hui was considered in the preparation of the Evaluation and Review report.

2.3.4 Submissions

In total, 1,406 submissions were received on this application. Of these submissions, 259 submitters indicated that they wished to be heard in support of their submission at a public hearing. Summaries of the submissions received are in Appendix T. Issues raised in the submissions are addressed throughout this report.

3 Evaluation and Review Report

3.1 Introduction

The aim of this Evaluation and Review (E&R) Report is to assist and support decision making by the Authority.

This report takes into account the following in relation to the application.

- Matters to be considered in section 29 of the Hazardous Substances and New Organisms Act 1996 (HSNO Act).
- Matters relevant to the purpose of the HSNO Act, as specified under Part II of the HSNO Act.
- The relevant provisions of the Hazardous Substances and New Organisms (Methodology) Order 1998 (the Methodology).

Unless otherwise stated, references to sections in this report refer to sections in the HSNO Act and references to clauses refer to clauses in the Methodology.

The purpose of the E&R Report is to assist and support decision making by:

- consolidating information provided by the applicants and obtained from other sources into a format that enables conflicts and similarities to be readily identified
- presenting the relevant information in a format and sequence that is consistent with the decision-making requirements of the HSNO Act and the Methodology
- evaluating the information (and assessments) provided to give an opinion on its quality and credibility, identify gaps, and analyse overlaps and conflicts
- identifying key issues arising from the evaluation relevant to the Authority's consideration of the application
- providing, where controls or conditions may be applied, technical advice on the control or condition options available
- advising the Authority on the classification of the substances.

The advice contained in the E&R Report is given solely on the basis of an objective and expert review of the application and the assessments of risks, costs and benefits provided in relation to that application.

The decision-making path and the steps involved in the decision path are in Appendix A.

3.2 Structure of the Evaluation and Review Report

A visual map of the E&R Report is in Figure 3.1. The report is organised into 11 sections, 21 appendices (labelled A–U), a glossary and a list of references.

In general, supporting information and detailed technical analyses of the information provided is in the appendices and cross-referenced from the main sections of the report.

Sections 1–3 set out the details of the application and the process.

Section 4 is a review of the application, particularly a review of the possible scenarios. The applicants have presented three scenarios: the baseline scenario, which represents current use, and two alternative future scenarios—one where the current use of 1080 continues without changes to controls and conditions (the ‘with 1080’ scenario) and another where the use of 1080 is discontinued and an alternative future is described (the ‘without 1080’ scenario). This section also describes the substances under consideration and summarises the lifecycle (from the import or manufacture to the disposal of the product) of both 1080 and cyanide (a substance that would be used more extensively if 1080 were not available).

Section 5 gives the classifications (the toxic and ecotoxic properties) of 1080 and substances containing 1080, and cyanide. The analyses of the information leading to these classifications are in Appendices B and C.

The lifecycle and hazardous properties of 1080 and substances containing 1080 are managed through a variety of controls. **Section 6** summarises the controls prescribed as part of the approval of these substances under the HSNO Act, the Agricultural Compounds and Veterinary Medicines Act 1997, and through requirements for resource consents through the Resource Management Act 1991. Further details of the existing controls on 1080 are outlined in Appendix L.

Section 7 of the report focuses on the identification and assessment of the risks, costs and benefits associated with the substances. For the purpose of this report, risks, costs and benefits are assessed using the terms adverse effects (which incorporate risks and costs) and beneficial effects.

Identifying risks, costs and benefits involves examining all sources of potential areas of impact and exposure pathways. The areas of impact are defined by sections 5 and 6 of the HSNO Act and include the natural environment, human health including public health, social and community matters, cultural and spiritual aspects, and economic aspects. Assessing risks costs and benefits consists of estimating the magnitude (significance) of the effect and the likelihood of that effect occurring. This qualitative assessment allows for comparisons across the different areas of impact. More details on the exposure and risk assessments are set out in Appendices M, N and O.

Section 7 also addresses international obligations and the likely effects of the substance being unavailable.

Section 8 covers an evaluation of the adequacy and effectiveness of existing controls and suggestions for additional controls and proposed changes to controls.

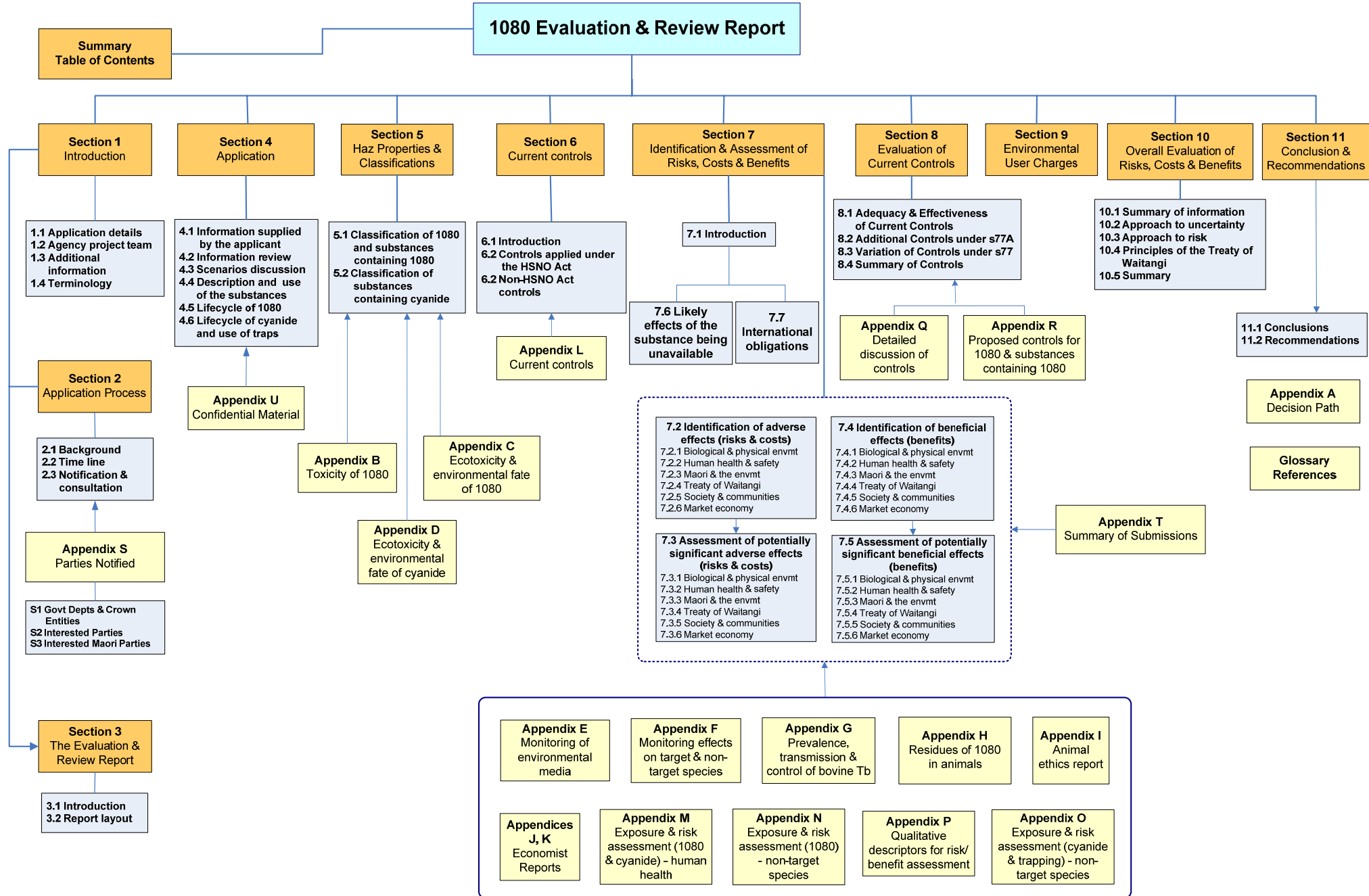
Section 9 comments on the imposition of environmental user charges.

The overall evaluation of the risks, costs and benefits is set out in **section 10**.

The final section, **section 11**, contains the conclusion and recommendations.

Key terms and abbreviations used in this report are explained in the **Glossary** after the appendices, and works cited are listed in the **References** at the end of the report.

Figure 3.1: Visual map of the Evaluation and Review Report



4 Application

4.1 Information supplied by applicants

The applicants supplied:

- the application
- copies of references cited in the application
- a confidential appendix detailing the proprietary ingredients in substances containing 1080.

4.2 Information review

The Agency has reviewed the information provided by the applicants and commented on the adequacy of it in the relevant sections of this Evaluation and Review (E&R) Report. The application contained a considerable amount of useful data and information and during evaluation of the application the Agency requested further information which was provided by the applicants.

Overall the Agency concludes that, on the weight of the evidence, the information provided by the applicants and the further information sought by the Agency constitutes an adequate and appropriate basis for considering the application.

The Agency has specifically identified areas where uncertainty in the information exists. These areas are summarised below, and their impact is discussed in the relevant sections of the report and in the overall evaluation section (section 10).

The risk management framework used by the Authority requires this focus on uncertainty. Clause 8 of the Hazardous Substances and New Organisms (Methodology) Order 1998 (the Methodology) requires the Authority to be mindful of the scale and significance of the risks, costs and benefits when reviewing the information available. In addition, according to clause 29 of the Methodology, when there is scientific and technical uncertainty or disputed information, the Authority must determine the materiality and relevance of that uncertainty. If such uncertainty cannot be resolved, clause 30 requires the Authority to take into account the need for caution in managing the adverse effects of the substance.

The Agency has identified the following areas where it considers that the materiality and relevance of the uncertainty needs to be considered:

- 1 The likelihood of the realisation of the proposed 'without 1080' scenario, and the adequacy of the applicants' modelling of the area of land that will be treated under it with implications for control of bovine tuberculosis and maintenance and enhancement of biodiversity.
- 2 Partnership, participation and engagement of iwi/Māori including regional inconsistency with regard to the engagement of iwi/Māori in

pest control and management initiatives generally and the impact of the lack of effective partnership, participation and protection of iwi/Māori (and their relationship with the environment and taonga) on Treaty of Waitangi provisions.

- 3 Economic analysis to support the postulated data on the beneficial economic effects of 1080.
- 4 The data/information on some of the properties of 1080 and possible exposures on the natural environment, non-target species, and society and communities, and the workforce. Particular gaps or uncertainties include:
 - a multi-generation reproductive toxicity study
 - storage stability of 1080 leading to uncertainty in the results of monitoring environmental concentrations
 - information on drift of 1080 ‘dust’ under field application conditions
 - extrapolation from studies on the non-target effects of 1080 and cyanide and/or trapping performed when the application methodology was different from that used presently.

As noted above, the Agency concludes that, on the weight of the evidence, the available information constitutes an adequate and appropriate basis for considering the application.

4.3 Discussion of scenarios

4.3.1 Introduction

The applicants have described three scenarios: a baseline scenario representing current use and two alternative futures, a ‘with 1080’ scenario and a ‘without 1080’ scenario.

These scenarios have two components.

- A summary of pest-control methods.
- A description of the expected alternative futures (to 2015) in terms of tuberculosis (Tb) control and impacts on conservation values.

These scenarios and the associated alternative futures are summarised in the table on p ES-7 of the application and analysed on pp 16–61 of the application. This section does not contain any references.

The Animal Health Board (AHB) and Department of Conservation (DoC) (the main users) use 1080 differently for different objectives. The AHB uses 1080 to reduce and eliminate Tb in wild animal populations. Its aim, therefore, is to reduce possum populations swiftly to low densities over large areas and to retain these reduced densities for extended periods (p 18 of the application). DoC uses 1080 to target priority areas to protect biodiversity values. These priority areas are those where DoC considers that 1080 is the cheapest and most effective option. (See section 7.3.6,

assessment of adverse effects on the market economy, for commentary on relative costs.)

The scenarios present a picture of the alternative futures to 2015, or approximately 10 years. While some aspects of the expected futures look beyond 2015, others do not, so the Agency has concentrated its evaluation on that 10-year time horizon.

This assessment is based on the current approaches to possum management employed by AHB, DoC and regional councils. The AHB in particular relies on a ‘knockdown and maintenance control’ approach. A recent paper (Morgan, Nugent and Warburton 2006) uses modelling to demonstrate that local elimination and perimeter control may be a more effective strategy and that while there are operational difficulties, this is a feasible strategy in the long term (beyond the 10-year future presented in the application and analysed in this report).

4.3.1.1 Relevant risks and benefits

Risk is defined in standard AS/NZS4360 as “the chance of something happening that will have an impact on objectives” (Standards Australia/Standards New Zealand 2004). The desired goals of the applicants are achieving bovine Tb-free status for New Zealand and maintaining and enhancing conservation values. Thus, risks and benefits to the applicants and their respective programmes can be measured in terms of the expected outcomes under the two scenarios (noting that expected outcomes are measured in terms of size of effect and likelihood of occurrence).

However, the Authority is concerned with the risks and benefits associated with the substance, 1080, throughout its lifecycle. The Hazardous Substances and New Organisms Act 1996 (HSNO Act) provides for the protection of the natural environment, health and safety, Māori cultural and spiritual values, society and communities, and the market economy. Risks and benefits are measured in terms of the magnitude of the effects and the likelihood of their occurrence under the specified scenarios. Risks and benefits must be considered at all stages of the lifecycle from the importation of the raw product to the disposal of product and baits.

4.3.1.2 Specification of scenarios

The applicants have described the scenarios in terms of expected outcomes and expected futures rather than in terms of the lifecycle of the substance. However, to be able to identify and assess the risks and benefits of the substance the scenarios must be defined in comprehensive manner, which includes a detailed specification of how the expected future will be realised. This requires separating the ‘expected future’ and the path by which the ‘expected future’ is realised. The remainder of this discussion distinguishes between the ‘scenario’, which is described in terms of the use of 1080 and other products and pest-control methods, and the ‘expected future’ or the outcome anticipated in 2015.

Use of the substance is a critical component of the lifecycle. In particular, the ‘without 1080’ scenario should include details of alternative products and how and where they are used, so their risks and benefits can be identified and assessed in relation to products containing 1080.. While some information is provided, it focuses on one possible alternative future that may not be.

The Agency has used the applicants’ scenarios as the basis for describing three scenarios that are then used to identify and analyse the risks associated with the use of 1080. The following analysis refers extensively to the application and concentrates on evaluating the information provided by the applicants and identifying points of difference between the applicants’ scenarios and alternative scenarios proposed by the Agency (refer to section 4.3.5). The main differences are around the assumptions.

4.3.1.3 Assumptions

The applicants have outlined the assumptions on which the scenarios are based on pp 38 and 40 (future with 1080) and 46 and 47 (future without 1080) of the application. These assumptions are critical to the establishment of the scenarios and subsequent identification and assessment of risks and benefits.

4.3.2 Applicants’ scenario 1: Baseline (current use)

4.3.2.1 Methods for pest control and how and where 1080 is used

The applicants have proposed a baseline scenario based on current use of 1080. This includes a combination of substances containing 1080 used in aerial and ground-laying programmes, trapping and a range of other poisons (see pp 5–8 of the application).

As noted earlier, the AHB uses 1080 as a mechanism for rapidly reducing possum numbers to low densities in targeted areas to prevent the spread of Tb. It is notable that the AHB uses 1080 on only 7% of the area that it treats on an annual basis.

Table 2 from the application (reproduced below) shows the area DoC treats annually using 1080 is about 133,000 hectares. The applicants note that the DoC area under sustained management (AUSM) covers about 1 million hectares of which about 25% is actively managed each year, and that DoC relies on 1080 for treating approximately 80% of its total AUSM (see Table 3 from the application below).

Similarly, the AHB and regional councils also have a larger AUSM than they treat annually: the AUSM area for the AHB is over 8 million hectares, and for the regional councils about 2 million hectares (p 33 of the application). (See Table 3 from the application below.)

The main use of 1080 is for aerial application in forest areas where access is difficult and expensive either because of the density of the forest or because of the ruggedness of the terrain.

Application Table 2²: Current situation: Annual area treated by pest control method (application, p 30)

Control method	Annual treatment area, hectares		
	Department of Conservation	Regional councils	Animal Health Board
Aerial 1080	127,000 (48.3%)	61,000 (7.6%)	396,000 (7.3%)
Ground 1080	5,800 (2.2%)	25,500 (3.2%)	4,000 (0.1%)
Traps and cyanide	129,800 (49.3%)	485,500 (60.7%)	4,500,000 (83.3%)
Other poisons	500 (0.2%)	228,000 (28.5%)	500,000 (9.3%) ³
Total hectares	263,100	800,000*	5,400,000

*Note: The regional council areas do not include operations managed by regional councils on behalf of AHB.

Application Table 3: Current scenario: Estimated areas under sustained management (application, p 33)

Control method	Areas under sustained management (AUSM), hectares		
	Department of Conservation	Regional councils	Animal Health Board
Aerial 1080	760,000 (77%)	242,000 (12%)	1,780,000 (22%)
Ground 1080	35,000 (3%)	101,000 (5%)	5,000 (0.1%)
Traps and cyanide	192,000 (20%)	1,127,000 (56%)	5,701,000 (70%)
Other	500 (0.1%)	530,000 (27%) ⁴	634,000 (8%)
Total hectares	992,700	2,000,000	8,120,000

Note: For DoC areas treated with 1080, a cycle time of six years has been used to estimate the area treated by aerial or ground methodologies in the average year. The estimated annual treatment area using traps and cyanide is the residual area once these 1080 averages have been deducted. A similar approach was used to estimate 1080 areas treated by regional councils using a cycle time of four years for 1080-treated areas. AHB figures presume an average cycle time of 4.5 years for aerial operations and 1.5 years for ground-based methods.

4.3.2.2 Amount of 1080 used

The baseline scenario describes the current amounts of 1080 used and the degree of control that is being achieved.

2 Table references in this section are to table numbers in the application (and repeated here).

3 The risks associated with alternative poisons vary. If 1080 use were to change significantly, then the use of these substances would also change and might trigger a review of the risks associated with these changes.

4 This is a significant proportion of the councils' AUSM.

The average amounts of 1080 bait used per year are (from pp 28 and 29 of the application):

- AHB: 900–950 tonnes
- DoC: approximately 430 tonnes
- regional councils: 50–100 tonnes.

This equates to approximately 2,140 kg of 1080 for all agencies combined, with an overall application rate (for the active ingredient) averaging approximately 3.5 g/ha (see p 29 of the application).

While the amount of bait applied has increased significantly, the amount of raw product imported has remained constant at approximately 2,500 kg for at least the past 10 years (see section 4.5 and Batchelor (1978, p 42)). This is because there have been significant advances in application methods.

4.3.3 Applicants' scenario 2: 'With 1080'

4.3.3.1 Applicants' assumptions and Agency evaluations

The applicants have based the development of the 'with 1080' scenario and the associated 'with 1080' future on the future intentions of the applicants, who are the main users of 1080. The following 11 assumptions are on pp 39 and 40 of the application.

- (1) Funding for Tb vector control and for DoC possum control is unlikely to increase to any significant extent. Regional councils are more likely to increase their possum control budgets, to improve biodiversity, especially if there was a significant scaling back by AHB operations. This would likely be by increased funding from property rating and might face political or public constraints in some regions.

Agency evaluation: The applicants have not provided any justification for the assumption that regional councils are more likely to increase their possum control budgets to improve biodiversity condition. Since the applicants are the main users for possum control the Agency accepts that their budgets are unlikely to change, and adopts a more conservative view with respect to regional councils that their budgets are unlikely to change much either.

- (2) The costs of aerial 1080 control for all agencies will continue to be cheaper than ground control. Control cost differences per hectare will continue as at present and the same cost multipliers will apply (see box 'Costs of controlling pests', p 12 of the application).

Agency evaluation: The applicants have not provided any evidence regarding the relative costs of aerial control and ground control other than indicating (on p 12 of the application) the cost multipliers used by DoC and the AHB. These are times two for ground control over aerial control

on ‘easy’ country and times four for ‘difficult’ country (average three). Professor Ross Cullen in his report in Appendix J cites three references as examples of work undertaken to explore this issue (Cullen et al 1996; Cullen and Bicknell 2000; Ross 2004). These references refer to a range of specific costed operations, and it is clear the situation is much more complex than the simple multipliers would indicate. Cullen, Kerr and Warburton (1996) report on aerial operations ranging from \$8 per hectare to \$54 per hectare, compared with \$21 per hectare to \$63 per hectare for ground-control contracts (costs for conservation volunteer operations are significantly higher). Since these are 1996 figures, the dollar values are not relevant, but the relative rates indicate that at the high cost end there is much less than a two times multiplier for ground-control costs.

Ross (2004) reports on a modelling project conducted in 2004 comparing costs for a range of possum control methods over a 10-year period. The results support the conclusion that the costs of aerial 1080 control for all agencies will continue to be cheaper than ground control. However, they suggest that the multiplier for ground control is closer to two than three (when representative consent costs are included), and costs for ground control using 1080 are similar to ground control using a mixture of trapping and Feratox.

The Hatepe trial conducted by Epro Ltd (Speedy 2003) reports standardised costs per hectare for five different treatment types. Aerial 1080 was the most effective treatment in terms of residual trap catch (RTC) with a cost of \$26.25 per hectare (with deer repellent included). Two other options with acceptable RTCs were 1080 in bait stations at a cost of \$43.45 per hectare, and contractors’ choice (Feratox, trapping and dogs) at \$36.77 per hectare. These results support a ratio of less than 2:1. This study notes the greater efficiency of aerial application in terms of the time taken to achieve the target result. Ground methods took longer and required repeat treatments.

The applicants provided further information, noting that on easy open country ground control can be much cheaper than aerial control, but that (logically) ground-control costs increase rapidly in areas where access is difficult. The Agency notes that costs of both aerial application and ground-based application are highly variable and changing over time as more efficient methods are employed for both processes.

- (3) Cost advantages of 1080 for protecting biodiversity values are likely to be an important consideration since 1080 aerial operations also provide important biodiversity benefits through the by-kill of rodents and mustelids.⁵

Agency evaluation: The Agency accepts the applicants’ assumption regarding cost advantages of aerial application of 1080 and pest by-kill for protecting biodiversity values.

⁵ Which cyanide and trapping do not provide.

- (4) As Tb eradication is achieved in certain areas and the control strategy moves to the next phase the use of aerial 1080 will become more important as more difficult country is targeted. Over these large areas ground operations are 'patchy' or are not possible due to terrain constraints.

Agency evaluation: The applicants have described how the AHB targets particular areas and expected future operations in new areas. There are significant differences between the way the AHB and DoC operate. DoC will always need to target 'difficult country'. Over time, the AHB will move to containment and fringe control. The Agency notes this assumption but does not agree that 1080 will necessarily become more important since no evidence for this is provided.

- (5) For DoC, the current strategic mix of operations is likely to continue, but could be affected by changes to the funding priorities for biodiversity protection, natural heritage protection, climate change adaptation and natural hazard responses.

Agency evaluation: A significant concern for DoC will be that as the AHB completes operations in particular areas and moves to fringe control, DoC may need to increase activities in back country areas.

The Agency accepts this assumption but acknowledges that there may be significant uncertainty about funding priorities.

- (6) Aerial 1080 can be used to target rat population irruptions should they occur following 'masting' years for fruiting or seeding and threaten species such as mohua.

Agency evaluation: The Agency acknowledges that 1080 is the only acceptable poison available for addressing rat irruptions. Brodifacoum is available for aerial application, but is seldom used because of residue levels and the length of time it remains in carcasses.

- (7) For regional councils the strategic mix will be significantly influenced by the rate at which Tb rates decline and the AHB operations are scaled back, although councils are taking on an increasing amount of pest control with respect to protecting natural heritage values.

Agency evaluation: The Agency agrees that changes in AHB operations will impact on regional council operations. However, it is clear that where AHB operations are reduced in line with the reduction in Tb in cattle and possums, regional councils may need to increase operations with the different objective of reducing possum damage. The extent of the impact over the duration of the 10-year scenario has not been described.

- (8) The use of 1080 ground control will remain minimal by AHB and DoC as the strategic focus continues to be on the benefits of large-scale operations.

Agency evaluation: Currently, AHB and DoC undertake very little ground control using 1080 and the Agency accepts the applicants' assumption that this is unlikely to change.

- (9) The use of 'other' methods will remain largely unchanged by all agencies.

Agency evaluation: The applicants note (p 5 of the application) that while research involving biotechnology is under way the time-frame before any such approaches can be implemented is expected to be more than 15 years. The Agency is in agreement with that assessment, which is discussed in more depth in section 7.6 of this report. However, it should be noted that the AHB use aerial application on 22% of its AUSM, and that 70% of the area is controlled using traps and cyanide.

- (10) Efficiencies and effectiveness of control methods are unlikely to improve significantly during this period.

Agency evaluation: There has been a history of continual improvement in the development of baits and efficiency of ground-based operations using both 1080 and other possum and pest control methods. The Agency considers that improvements will occur over the 10-year period, but acknowledges that the rate of improvement may be less than over the past 10 years.

- (11) 1080 will continue to be an important toxin to retain in the toolbox for wallaby and rabbit control, particularly in areas such as Canterbury and Otago, where resistance levels to RCD (rabbit calicivirus disease) in rabbits are already high and are likely to continue rising.

Agency evaluation: The Agency concurs with the applicants that 1080 is a valuable tool for wallaby and rabbit control, and acknowledges that it is likely rabbit numbers will increase significantly in the next few years, especially in dryland areas of the South Island such as Marlborough, South Canterbury and North Otago.

4.3.3.2 Methods for pest control and how and where 1080 will be used

Applicants discussion

This scenario sees the current mix of use of 1080, trapping and use of other poisons continuing into the future.

The applicants note that the AHB expects to increase use of 1080 over the next 10 years (p 44 of the application) and to treat different areas, moving Tb control into more 'difficult to treat' areas. (See Table 4 from the application below.)

4.3 Discussion of scenarios

The DoC pest-control programme using 1080 is expected to be similar to the present programme. DoC would continue to control about 260,000 hectares annually out of a total area of around 1 million hectares that it now has under sustained possum management. Approximately 75%–80% of that area is controlled using 1080 on a rotational basis. DoC use of 1080 (and all other pest-control methods) is constrained by funding.

Regional councils may increase their use of 1080 for biodiversity purposes, but this would also be subject to funding. The applicants note that if the AHB changes the areas it chooses to control, then other parties such as regional councils may need to undertake more active control on areas previously managed by the AHB. Whether this would require greater use of 1080 cannot be predicted.

Application Table 4: Areas treated annually by AHB for Tb with future use of 1080 (application, p 40)

Control method	Current areas treated annually, hectares	Future area treated annually, hectares
Aerial 1080	396,000 (7.3%)	996,000 (17.5%)
Ground 1080	4,000 (0.1%)	4,000 (0.1%)
Traps & cyanide	4,500,000 (83.3%)	4,200,000 (73.7%)
Other poisons	500,000 (9.3%)	500,000 (8.7%)
Total	5,400,000	5,700,000

Agency evaluation

The applicants have provided a summary of the expected future use of 1080 by the AHB, DoC and regional councils, and have listed the assumptions on which this is based.

One particular aspect of the expected future use of 1080 that is not well supported is the relative costs of aerial (1080) and ground control (primarily cyanide and trapping) (assumption (2)). The Agency has obtained information on this, which is discussed above. In addition, while the Agency accepts that alternative methods (eg, biocontrol and new poisons) are unlikely to be implemented in the next 10 years, additional information about current research would have been useful (see section 7.6 of this report).

4.3.3.3 Amount of 1080 used

Applicants discussion

As well as increasing its controlled area, the AHB plans to increase the quantity of 1080 it uses. DoC expects to continue using the same quantity of 1080. Any change in use by regional councils cannot be easily predicted.

Agency evaluation

The Agency agrees that under current funding regimes DoC is not likely to change the amount of 1080 it uses.

Little information exists about the intentions of regional councils, which will depend to a large extent on DoC and AHB operations. Regional councils use trapping and cyanide for 56% of the land area under their AUSM, with 1080 being used on 17%. A significant area treated for vertebrate pests by regional councils will be close to inhabited areas. Given that the relative costs of ground control using 1080 and using traps and cyanide are very similar, and councils use aerial application of 1080 for 12% of the area they treat, the Agency does not consider it likely that regional councils will change their pattern of use significantly over the 10-year period if 1080 remains available.

Table 4 (p 40) in the application suggests the AHB plans to more than double the area treated annually using aerial drops of 1080. Currently, the AHB uses 900–950 tonnes of 1080 bait per year. This suggests the amount of bait would be at least 1,800 tonnes. DoC uses about half the amount the AHB uses, so it can be postulated that the amount of technical-grade active 1080 required would increase by 15%–25%. An increase in the quantity of raw product would require the manufacturer in the United States to increase supply.

4.3.3.4 Factors affecting the realisation of this scenario

The Agency acknowledges that it is difficult to predict future use and that the scenario presented by the applicants represents a ‘best guess’, based on previous experience and the objectives of the different agencies.

The following factors are uncertainties that may impact on the realisation of the proposed future, either by improving or threatening the likelihood of its being achieved. In this sense they can be viewed as sensitivity parameters.

- Improved application or delivery methods, reducing quantities required or reducing the frequency of application.
- The introduction of new poisons.
- The introduction of alternative ways of reducing possum numbers such as biocontrol approaches.
- Large increases in rabbit numbers requiring diversion of effort (DoC has limited resources and may need to change priorities in some areas).
- Rodent and mustelid irruptions requiring diversion of effort (eg, mast years in beech). However, such irruptions are episodic and not expected to change trends.
- Alternative ways of controlling Tb in dairy herds (AHB related).
- The ability to import 1080 and manufacture baits at the current pricing structure (DoC operations are constrained by cost).
- The availability of 1080 given the reliance on a single manufacturer in the United States.
- Changes in operational costs.

4.3.4 Applicants' scenario 3: 'Without 1080'

In considering the risks of the 'without 1080' scenario, the applicants have concluded that some land that is currently treated with 1080 will be treated with a combination of cyanide and trapping, and other land will not be treated due to the higher cost of cyanide and trapping compared with the aerial application of 1080.

The magnitude of the effects on Tb and non-target organism populations will be affected by the reduction in the area of land treated under the 'without 1080' scenario. Uncertainty in predicting this area is, therefore, key to a consideration of the effects of the 'without 1080' scenario. The applicants estimated the area to be treated on an economic basis, that is, the relative cost of cyanide and trapping versus aerial 1080 application (see below).

The Agency notes that effects on the environment in areas receiving no treatment are identified in section 7.2.1 of this report.

The applicants have not investigated the use of other 'without 1080' scenarios; for example, the use of other vertebrate toxic agents other than cyanide.

4.3.4.1 Applicants' assumptions and Agency evaluations

The following 13 assumptions are listed on pp 46 and 47 of the application.

- (1) Funding for Tb vector control and possum control by DoC is unlikely to increase to any significant extent.

Agency evaluation: The Agency acknowledges this assumption based on DoC's expectations and strategic planning, but notes that given the importance of 1080 to DoC, in its absence DoC would need to reconsider its priorities.

- (2) Funding for possum control by some regional councils will need to increase significantly to meet the extra costs given the absence of 1080 and an anticipated increase in biodiversity and natural heritage pest control projects. Additional council funding would likely be from property ratings and might be constrained by political and public opposition to the required level of increase in some regions.

Agency evaluation: This assumption is predicated on AHB operations moving on from areas where targets have been achieved. The applicants have not provided substantive backing for this assumption. As discussed in section 4.3.3.3 councils currently use 1080 for only 17% of their AUSM.

- (3) Cost differentials will continue as at present between ground-control methods and aerial control (see box ‘Costs of controlling pests’, p 12 of the application).

Agency evaluation: See also section 4.3.3.1, the discussion under assumption (2) on cost differentials.

- (4) Because of difficulties of trapping and higher costs of operations, AHB would only be able to ‘buffer’ the forest margins of difficult country. For similar reasons those sites currently treated by DoC by aerial 1080 operations would reduce in size by at least 66%.

Agency evaluation: The Agency accepts the AHB position regarding the buffering of forest margins in difficult country, and acknowledges similar issues with respect to DoC operations. The second sentence in assumption (4) above has been interpreted as meaning ‘of those sites currently treated by DoC by aerial 1080 operations at most 34% would continue to be treated’. This implies that DoC would no longer be able to treat an area in the order of 500,000 hectares (66% of a total of 760,000 hectares AUSM).

- (5) DoC’s strategic mix of operations is likely to switch to a focus on localised treatment programmes for species protection and representative site protection. Broad-scale goals currently associated with natural heritage protection and, in the future with climate change, are likely to become a minor part of the Department’s possum control programme.

Agency evaluation: The Agency accepts DoC’s view of the possible future without 1080, but notes that without detailed information about the costs of alternative methods in the particular areas that would not be treated aurally, it is not possible to test this assumption.

- (6) The total area treated by regional councils may increase, finances permitting, but the size of these increases would be less, because of higher ground-control costs, than if 1080 had still been available.

Agency evaluation: The applicants have not provided any specific foundation for this assumption of a possible increase in total area treated. Given that regional councils do not use a large amount of 1080 at present, it is hard to predict that they would increase use without further evidence. The Agency agrees that ground-control costs are higher than aerial control costs. It is unclear how it impacts on the scenario.

- (7) Regional councils will still be endeavouring to increase their pest control operations to meet regional pest management strategies and maintain AHB-funded Tb operations.

Agency evaluation: The Agency interprets this as meaning that councils will try to meet the gap vacated by AHB. However, this assumption is

unclear as it implies that the ‘with 1080’ the goals outlined in the strategies would be met, whereas realistically there has to be a degree of uncertainty.

- (8) Areas with rugged and very difficult terrain are most unlikely to be treated at all by DoC, regional councils or AHB. While control in ‘buffer zones’ may be possible, this would not protect biodiversity values that may be at risk within these difficult areas.

Agency evaluation: The Agency accepts that without aerial control of rugged and difficult terrain, possum numbers will increase and consequently it may not be possible to protect (or enhance) biodiversity values to the current extent. The Agency notes that some areas will not be treated and that this could have long term adverse effects.

- (9) The use of ‘other’ methods will remain largely unchanged by all agencies.

Agency evaluation: See the comment in section 4.3.3.1 under assumption (9) for the ‘with 1080’ scenario.

- (10) Forestry companies will not have 1080 as a cost-effective tool for large-scale protection of plantation forests at either establishment or later for control of rabbits, hares, and possums.

Agency evaluation: The Agency notes that this is a statement rather than an assumption. It implies that 1080 is cost effective for forest protection but does not provide evidence. This issue is discussed further in the assessment of beneficial economic effects (see section 7.5.6 of this report).

- (11) Ground control for rabbits over large areas will be inadequate, costly and inefficient.

Agency evaluation: See the comment under assumption (10) above. The Agency also notes that alternative methods for controlling rodents are in most cases less humane (eg, pindone and phosphorus). For example, the Royal New Zealand Society for the Prevention of Cruelty to Animals (SPCA) notes in its submission that, “The SPCA remains totally opposed to the use of phosphorus as an alternative to 1080, this opposition being on the grounds of the humanness of that substance”.

- (12) No broad-scale technique will be available for combating irruptions in predator populations.

Agency evaluation: The Agency recognises that in particular the loss of 1080 would mean rodent irruptions could not be easily controlled.

- (13) For the purpose of this assessment, the significant rise in demand for ground-trapping and baiting operations could be met by contractors and suppliers without a drop in quality control.

Agency evaluation: The Agency cannot comment on quality control issues. However, there is no reason to differ from this assumption. There

would clearly be a capacity and cost issue with increased numbers of contractors required.

4.3.4.2 Methods for pest control and how and where they will be used

Applicants discussion

The applicants state that if 1080 were not available for use, then the most likely scenario would be that pest control would be a mixture of trapping and poisoning. For possum control, cyanide would be the most likely poison as it kills possums rapidly, and therefore carcasses can be collected for fur or pelts (p 17 of the application). Section H (pp 46–56 of the application) describes the expected outcome for Tb and conservation management in 2015 if 1080 is not available.

Agency evaluation

The Agency concurs with the applicants that in the absence of 1080 the most likely methods for possum control would be increased use of cyanide and trapping. The applicants have not provided any detail on how pests other than possums (and to some degree rabbits) would be controlled in the absence of 1080. Pages 6–8 of the application discuss the currently available poisons for vertebrate pest control and describe their advantages and disadvantages. Since less area would be able to be controlled on current budgets (since aerial application is cheaper), and some areas would not be able to be treated using ground-control methods, the Agency agrees that less control would be achieved and that this would impact on AHB and DoC goals and objectives.

Other species that are currently intentionally controlled by 1080 include wallabies, deer, feral cats, rodents and wasps and these would need another mode of control.⁶

4.3.4.3 Factors affecting the realisation of this scenario

The Agency accepts that if 1080 is not available, then the most likely substitute will be increased trapping and use of cyanide for possum control. There may also be an increase in the use of the other poisons available, but this would be speculative and therefore has not been assessed. The primary effect of the unavailability of 1080 would be that there would be no aerial drops for the control of vertebrate pests. This would significantly impact on DoC objectives since 48% of the area it controls for biodiversity purposes is treated using aerial drops of 1080 (see Table 2 from the application above).

While the AHB is also heavily reliant on 1080 to meet its objective of Tb-free status⁷ for New Zealand, the AHB uses aerial drops of 1080 on only

⁶ Currently, no 1080 bait is registered for mustelids. However, significant by-kill of mustelids occurs during 1080 operations.

⁷ As discussed in Section 4.4 of the application, the Office Internationale Epizooties (World Organisation for Animal Health) Code sets the internationally accepted definition of bovine

22% of its AUSM. Another issue relates to bait shyness and possums developing an aversion to cyanide. These factors illustrate the importance of maintaining a range of tools that can assist in maintaining the effectiveness of cyanide.

Factors that would have the greatest impact on the assumed consequences arising from this scenario are:

- the introduction of new vertebrate poisons that are at least as effective and cost effective as 1080 and can be delivered to the same areas currently requiring pest control
- the introduction of alternative ways of reducing possum numbers such as biocontrol approaches
- large increases in rabbit numbers requiring a diversion of effort (see section 4.3.3.1 - this may also apply to rodent and mustelid irruptions under varying conditions, for example, mast years in beech forests).

Another aspect for consideration is whether any of the alternative poisons available for vertebrate pest control would need reassessment on the grounds of a significant change in use. Since ERMA New Zealand decisions are made on a case-by-case basis, it is not relevant to the reassessment of 1080, but this consideration is noted.

The Agency is aware of research being undertaken with respect to ‘new’ vertebrate poisons and alternative methods for reducing possum numbers. The National Research Centre for Possum Biocontrol⁸ is undertaking research over a range of areas.⁹ However, the time-frame is such that even the most promising of these options is unlikely to be able to be ‘delivered’ by 2015 (see also section 7.6 of this report).

4.3.5 Agency commentary on alternative scenarios

4.3.5.1 Introduction

In addition to the alternative ‘without 1080’ scenario, the Agency has also briefly considered three other alternative scenarios: no aerial use of 1080; aerial use of 1080 on only difficult terrain; and 1080 used for the ground control of key species.

Tb freedom as when 99.8% of domestic cattle and deer herds have been free of bovine Tb for three years. New Zealand’s Pest Management Strategy is to reduce the number of Tb-infected cattle and deer herds from 0.5% (currently) to 0.2% by 20 December 2012. However, this is not a global commitment that the New Zealand Government has signed up to. The benefits of Tb-free status would be the ability to trade live animals with other recognised Tb-free countries.

8 <http://possumbiocontrol.agresearch.co.nz>

9 Genetically-engineered possum-specific nematodes, viruses damaging possum fertility, zona pellucida protein-based vaccines, gut ion transporter system toxins, and hormone-toxin conjugates.

The issue of aerial use of 1080 is of great concern to many members of the public, with a significant number of submitters requesting that aerial use not be permitted. The main reason for this request was the claim that aerial 1080 is indiscriminate and causes by-kill and suffering of non-target species.

However, aerial use of 1080 is very important to all agencies using the substance, because it is the only way to treat large areas of high-level forested country that are essentially inaccessible for ground-control methods.

Of significant concern also is that 1080 is the only vertebrate poison available for some species such as feral cats and wallabies, and the main mechanism for addressing mustelid and rodent irruptions where a range of methods is required.

Several submitters felt that by only having a total ban on the use of 1080 as the alternative scenario, the applicants had biased the application since a total ban would have serious ramifications for pest control. These submitters would have preferred that the applicants had considered a wider range of options.

The Agency has, therefore, proposed and discussed three further scenarios as alternatives to the ‘with 1080’ scenario. Because of the constraints of the evaluation process the risks, costs and benefits associated with each of these scenarios have not been assessed in the later sections of this report. However, the following evaluation seeks to highlight how each of these scenarios would differ from the current ‘with 1080’ and ‘without 1080’ scenarios presented by the applicants.

4.3.5.2 Additional scenario 1: Future with no aerial use of 1080

If aerial drops of 1080 were not permitted, then the AHB would lose its ability to rapidly reduce Tb reservoirs and to stabilise low possum numbers in target areas.¹⁰ The AHB has indicated that this would seriously hamper, if not make impossible, achievement of the AHB goal of Tb-free status for New Zealand.

Consequently, Tb would persist in wild animal populations (possums, deer etc) in areas of forest where it is currently found. In the absence of aerial operations, ground-control efforts would be targeted at maintaining low density possum buffers around priority areas. The applicants note that historically, this option has been significantly more expensive than aerial control as it has to be repeated annually compared to the four- to five-year cycles for aerial control.¹¹ More importantly, ground control is not as

10 More specifically, the applicants forecast that without 1080 aerial application “it will be impossible to eradicate Tb from certain possum populations and difficult to contain the spread of Tb infection”.

11 The Agency has discussed the relative costs of aerial control and ground control in section 4.3.3.1, but has not factored in cycle time. The studies that have been reviewed in reaching the relative cost conclusions have considered cost-effectiveness (ie, the numbers of animals

effective as aerial control at restricting the movements of Tb-infected possums onto farms. This is because of the greater scale, evenness and consistency of control achieved by aerial operations.

Similarly, DoC would lose its ability to treat large areas of otherwise inaccessible forest country. DoC and the AHB make relatively little use of ground-based 1080 compared with their aerial usage. Thus, for the AHB and DoC this scenario would effectively be similar to the ‘without 1080’ scenario.

Compared with DoC and the AHB, regional councils make more use of ground-based methods of applying 1080, but the area they work with uses less aerial 1080 application and is comparatively small. If 1080 were available only for ground use it is not clear whether the regional councils would make greater use of 1080 in this way, or whether they would increase use of cyanide and trapping.

However, importantly, 1080 would remain available for use in controlling key pests such as feral cats, wallabies, goats, mustelid and rodent irruptions, but could be used in only accessible terrains.

This is essentially a scale issue. While 1080 would not be available for large-scale operations and this would have a significant impact on conservation outcomes, it would remain an important tool for small-scale operations, particularly for key pests where no alternative poisons are available.

4.3.5.3 Additional scenario 2: Future with 1080 only applied aerially on difficult terrain

This scenario proposes that 1080 be allowed to be used for only for aerial drops on land that cannot be easily accessed for ground control.

Clearly, there would be difficulties designating these areas. It is likely that regional councils would need to take responsibility for this designation probably through regional plans, which would require considerable public consultation. Additionally this would be a value judgement and likely to vary regionally and thereby adding uncertainty to the designations.

The primary tools for ‘accessible’ areas would be cyanide and trapping. There are two issues here: the cost of control would increase, and bait shyness could result.

While in theory this approach would allow the AHB to achieve its goal of Tb-free status, and allow DoC to maintain and enhance conservation and biodiversity benefits, the difficulties around establishing the areas where

killed), but have not looked at long-term effectiveness. There is no reason to expect any difference between the two methods of control where equivalent numbers of possums are killed. Therefore, in stating that different cycle times are required, the applicants are implying that the outcome of these ground-control methods are different to the outcome of aerial operations, and this is most likely due to the ‘reservoir’ effect and immigration.

1080 could be applied aerially might well make the process difficult and even uneconomic. Further, the loss of 1080 for the small-scale control of key pests would be a significant problem for DoC and regional councils.

4.3.5.4 Additional scenario 3: Future with 1080 only used for ground control of key species

This scenario proposes that 1080 only be allowed to be used for the ground control of the key species (ie, feral cats, wallabies, goats, mustelids and rodents) where there are no feasible alternatives.

The effects of this scenario would be similar to the ‘no aerial’ and ‘without 1080’ scenarios except that the key pests would be able to be controlled where terrain is conducive to ground control.

4.4 Description and use of the substances

4.4.1 Identification of the substances

This reassessment application covers the approvals under the HSNO Act listed in Table 4.1.

Sodium fluoroacetate (1080) is the technical grade active ingredient that is used in the manufacture of the additional substances containing 1080. The unequivocal identification of 1080 is detailed in Table 4.2.

Table 4.1: Approvals covered by the reassessment application

Substance name	HSNO approval number
Sodium fluoroacetate (1080)	HSR002771
Soluble concentrate containing 200 g/litre sodium fluoroacetate	HSR002427
Pellets containing 1.5–2.0 g/kg sodium fluoroacetate	HSR002424
Pellets containing 1.0 g/kg sodium fluoroacetate	HSR002423
Pellets containing 0.4–0.8 g/kg sodium fluoroacetate	HSR002422
Paste containing 10 g/kg sodium fluoroacetate	HSR002425
Paste containing 1.5 g/kg sodium fluoroacetate	HSR002421
Paste containing 0.6–0.8 g/kg sodium fluoroacetate	HSR002420
Gel containing 50 g/kg sodium fluoroacetate	HSR002418
Gel containing 100 g/kg sodium fluoroacetate	HSR002426
Gel containing 1.5 g/kg sodium fluoroacetate	HSR002419

Table 4.2: Unequivocal identification of 1080

Chemical name	Sodium fluoroacetate
Synonyms	1080; Sodium fluoroacetate; Sodium monofluoroacetate; Sodium fluoroacetic acid; Fluoroacetic acid, sodium salt; Acetic acid, fluoro-, sodium salt
CAS registry number	62-74-8
UN number	2629
Proper shipping name and classification for transport	Sodium fluoroacetate Class 6.1 PG 1; Hazchem code 2X

4.4.2 Chemical and physical properties of 1080

The chemical and physical properties of 1080 are in Table 4.3.

Table 4.3: Chemical and physical properties of 1080

Chemical and physical properties of 1080	
Molecular formula	F-CH ₂ -C-O ₂ -Na
Molecular weight	100.03
Structural formula	<p>The structural formula shows a central carbon atom double-bonded to an oxygen atom above it, single-bonded to a fluorine atom (F) on the left, single-bonded to a methylene group (CH₂) on the left, and single-bonded to an oxygen atom (O⁻) on the right. The oxygen atom is further bonded to a sodium ion (Na⁺).</p>
Purity	90% (w/w) minimum (typically 95–98.5% in analysis by importer)
Significant impurities	Potassium fluoride, 1% maximum Ethyl chloroacetate, 1% maximum Sodium hydroxide, 0.5% maximum Methanol, 0.5% maximum Water, 6.9% maximum
Appearance	Colourless hygroscopic powder (APVMA 2005)
pH	Sodium fluoroacetate is a sodium salt of fluoroacetic acid which is a tan coloured alkaline powder with a pH of 10.3. This is probably due to the sodium hydroxide impurity (USEPA 1995). Approx. 6.5 for 20% solution (Section 3.2 of application).
Bulk density	Unknown
Vapour pressure	Non-volatile (APVMA 2005)
Melting point/thermal stability	Decomposes at about 200°C (APVMA 2005). The applicants state that the main decomposition products include: carbon monoxide, carbon dioxide, formaldehyde, silicon tetrafluoride and fluoroacetyl fluoride.
Solubility	Highly soluble in water and poorly soluble in organic solvents such as ethanol, acetone and petroleum oils (APVMA 2005)
Stability	Stable in sunlight at 54°C (USEPA 1995)

4.4.3 Use of substances containing 1080

In New Zealand, substances containing 1080 are used as vertebrate toxic agents. Currently, there are substances containing 1080 registered under the Agricultural Compounds and Veterinary Medicines Act 1997 (ACVM Act) for use to control possums, rabbits, deer, wallabies, rodents and feral cats. Additionally, one substance containing 1080 is registered under the ACVM Act for use as an insecticide for the control of wasps. For further details on how the substances are used, see section 4.5 of this report.

4.5 Lifecycle of 1080

The applicants have detailed the lifecycle of 1080 and substances containing 1080 in Section 3.5 of the application. The Agency provides a summary of the lifecycle of 1080 and substances containing 1080 as detailed by the applicants below and includes additional information the Agency considers relevant.

4.5.1 Manufacture

The Agency's understanding is that over 90% of the substances containing 1080 used in New Zealand are manufactured by Animal Control Products Limited (ACP), a State-owned enterprise. ACP has two manufacturing sites: one in Wanganui and one in Waimate. The Agency notes that there are two substances containing 1080 that ACP does not manufacture. The trade name product 'No Possums 1080 Gel Bait' is manufactured by Kiwicare Corporation Limited, a Christchurch-based company and the trade name product '1.0% 1080 Waste Paste' is manufactured by Landcare Research, a Crown Research Institute.

The Agency notes that the applicants' have only detailed the manufacturing stage of the lifecycle for manufacture by ACP. In the sections below, the Agency summarises the information supplied by the applicants and gives consideration to manufacture by other organisations.

4.5.1.1 Import and delivery to Animal Control Products' manufacturing sites

The active ingredient sodium fluoroacetate (1080 technical-grade active) is manufactured in the United States and imported into the Port of Auckland in shipments of approximately 500 kg. During importation the technical-grade active is packed in 10 kg plastic pails with plastic liners in a wooden crate inside a shipping container. Transport of the technical-grade active by sea is subject to the International Maritime Dangerous Goods Code.

Within New Zealand, the technical-grade active is transported by road to the manufacturing site in Wanganui. Road transport is carried out by a transport operator contracted to ACP. For transport, the wooden crate containing the substance is unloaded from the shipping container into a purpose-built steel crate. Land transport of the substance is subject to the Land Transport Rule: Dangerous Goods 2005 (Rule 45001/1).

The applicants advise that the crate containing the technical-grade active is not opened until receipt at the manufacturing site, where it is unloaded into a dangerous goods store.

The Waimate site does not handle the technical-grade active. Products at this site are manufactured from a soluble concentrate containing 200 g/L sodium fluoroacetate (the stock solution), which is prepared at the Wanganui site and transported to Waimate.

The applicants state that on average the total quantity of the technical-grade active imported to New Zealand is around 2,500 kg per year and advise that this amount has been typical for the past 10 years.

4.5.1.2 Manufacture of substances containing 1080 by Animal Control Products

The applicants advise that the first step in the manufacturing process is the production of a soluble concentrate containing 200 g/L 1080. This solution is made by dissolving the technical-grade active in water. The stock solution is packaged in 5 L bottles, and prepared in batches of approximately 300 bottles. The process is typically carried out three to four times per year.

The applicants advise that ACP manufactures all substances containing 1080 from the stock solution. Products are manufactured to order and production is scheduled accordingly. The main formulations manufactured are shown in Table 4.4.

The applicants advise that cereal pellets are the most widely used substances comprising close to 90% of ACP's production.

Table 4.4: 1080 formulations

Product	Description
Stock solution	Twenty percent solution (200 g/L) for coating apple, carrot and grain baits. This is the same as the soluble solution used for preparing other formulations, but has a black dye added. This is packaged in 5 L containers
Pellets	<p><i>Cereal pellets</i></p> <p>Pellets are manufactured by compressing a mixture of ground cereal, sugar, 1080 stock solution, green dye and flavouring such as cinnamon. The ingredients are mixed in a hopper, then extruded into pellets ranging in size from 2 g to 12 g, containing 0.4–2.0 g/kg of 1080.</p> <p>Green dye is added to reduce the attractiveness of the baits to birds, and flavouring masks any odour of 1080, as well as deterring birds. The applicants state that cereal pellets have a reasonably long shelf-life under suitable storage conditions and are easily handled. Pellets are bagged for sale and distribution in 25 kg multi-wall paper bags.</p> <p><i>Fish-based pellets</i></p> <p>Used for the control of feral cats. These pellets are produced as 2 g pellets only and are packaged in 10 kg multi-wall polyethylene-lined bags. Green dye is added to the pellets to reduce their attractiveness to birds.</p>
Pastes	<p>Pastes are made from apple pulp, invertase sugar and water, mixed with 1080 stock solution, green dye and lure oil. Three pastes are made, containing 0.6 g/kg, 0.8 g/kg and 1.5 g/kg 1080. These are packaged in 20 kg plastic pails.</p> <p>In addition to the above pastes that are manufactured by ACP, the product '1% 1080 Wasp Paste' is a sardine based paste manufactured by Landcare Research.</p>
Gels	<p>Gels are made from polymer mixed with 1080 stock solution, green dye and cinnamon oil. Gels have a similar consistency to pastes, being similar to jam, but are clear rather than opaque. Three gels are made, containing 1.5 g/kg, 50 g/kg and 100 g/kg 1080. These are packaged in 500 g tubes.</p> <p>The Agency notes that in addition to the gels manufactured by Animal Control Products, Kiwicare Corporation Limited also manufacture a gel formulation.</p>

4.5.1.3 Management of Animal Control Products' manufacturing sites

The applicants specify that ACP has accreditation to ISO9001:2000 for its manufacturing operations and is inspected twice a year by Bureau Veritas Qualifications International, which reviews quality procedures.

The applicants note that the manufacturing sites are also subject to regular inspections by the Department of Labour. Health and safety procedures are applicable to all employees, consistent with the *Guidelines for the Safe Use of Sodium Fluoroacetate (1080)* (Department of Labour 2002). The applicants advise that workers are fully suited and wear respiratory protection when handling 1080 powder and preparing the stock solution. Workers shower before removing the suits, which are then disposed of.

The Agency understands that the workplace is monitored against current Department of Labour workplace exposure standard (WES) values. The Agency also understands employees undergo biological monitoring (discussed in Appendix M) and the results are compared against the Department of Labour Biological Exposure Index. Occupational exposures are considered in detail in section 7.2.2.

Vehicle and visitor access to the sites is controlled, and the applicants advise that all facilities are kept secure. Emergency procedures are in place covering fire and other emergencies that could result in the accidental release of 1080 (or any other hazardous substances held on the sites). Manufacturing and storage areas are bunded. All manufacturing and storage is carried out under cover.

All manufacturing equipment is dismantled and thoroughly cleaned between production runs; the applicants advise that this is done to eliminate cross-contamination. Additionally, batches are programmed to minimise cross-contamination between 1080 and other products. For example, a typical order of production would be: non-toxic pre-feeds (which contain no toxin and no dye), brodifacoum pellets, and then 1080 pellets.

4.5.1.4 Disposal of waste from Animal Control Products' manufacturing sites

Waste disposal processes for ACP's two manufacturing sites are the same.

Solid wastes from the manufacturing process containing 1080 are recovered and reused, minimising waste.

Washdown water cannot be recycled in the same way and is collected in an underground waste tank. The tank is emptied on a monthly basis by a waste contractor and volumes recorded. The contractor disposes of the liquid waste by spraying to landfill. Landfill disposal is subject to regional resource consent conditions (see section 4.5.5).

Plastic pails are washed and punctured, so they cannot be reused, and are then disposed of to landfill. The plastic liners in the pails are removed, washed and disposed of along with other solid waste (such as packaging, disposable gloves and overalls) to landfill.

4.5.1.5 Manufacture of substances containing 1080 by other manufacturers

The Agency notes that the applicants have not supplied details of the manufacturing processes carried out by Kiwicare Corporation Limited and Landcare Research. The Agency notes, however, that the processes and facilities of these manufacturers are managed by the same regulations as are those of ACP, so expects that these manufacturing sites are subject to the same monitoring by the Department of Labour.

4.5.2 Transport and distribution

The applicants advise that ACP mainly supplies professional pest controllers with the substances containing 1080. However, some of the product is distributed directly to DoC or regional councils. The product is dispatched by road and transport and is required to be carried out in accordance with the Land Transport Rule: Dangerous Goods 2005 (Rule 45001/1) and the controls in place under the HSNO Act approvals for substances containing 1080.

The Agency notes that regardless of the manufacturer, substances containing 1080 are required to be transported in accordance with HSNO Act requirements and the requirements of the Land Transport Rule: Dangerous Goods 2005 (Rule 45001/1) when transported by road in New Zealand.

In addition to dispatch from the manufacturers' facilities, transport by contractors from storage depots to operational areas will occur. The Agency notes that 1080 and substances containing 1080 are considered dangerous goods. For transport purposes, under the Land Transport Rule: Dangerous Goods 2005 (Rule 45001/1), when a commercial operator is transporting 1080 formulations the driver must hold a current dangerous goods endorsement on their driver licence. The exception to this requirement is where 1080 formulations are being transported for use as tools-of-trade and not for hire or direct reward and the:

- quantity of 1080 formulation carried is within the limits prescribed in Schedule 1 of the Land Transport Rule: Dangerous Goods 2005; or
- driver holds an approved handler test certificate that:
 - was issued in accordance with regulations 4 and 5 or regulation 6 of the Hazardous Substances and New Organisms (Personnel Qualifications) Regulations 2001; and
 - shows that the approved handler has passed a course on the transport of dangerous goods; and
 - is carried by the driver and made available to a dangerous goods enforcement officer, a police officer or a HSNO Act enforcement officer immediately on request.

4.5.3 Application of substances containing 1080

Both aerial and ground-based methods are used to apply substances containing 1080. As previously noted, the applicants indicate that the most commonly used formulation type is cereal bait (close to 90% of ACP's production). The use of stock solution for coated baits is the second most common use, with gels and pastes making up only a small proportion of total 1080 use (5% or less).

All operations undertaken for the AHB are carried out by professional pest-control contractors or regional council pest-control staff under contract to the AHB. Regional council staff may also undertake 1080 pest-control operations on council land for conservation purposes. Operations undertaken by DoC may be undertaken by DoC staff or professional pest-control contractors.

The application of substances containing 1080 is subject to controls set under the HSNO Act and ACVM Act and through requirements for resource consents under the Resource Management Act 1991 (RMA). Details of these controls are in section 8 of this report.

4.5.3.1 Aerial application

At present, substances containing 1080 or brodifacoum are the only vertebrate toxic agents that may be applied by aerial application. Bait containing 0.02 g/kg brodifacoum may be applied by aerial means only if the application is done in accordance with an ACVM Act code of practice or is applied by DoC on an off-shore island (Hazardous Substances (Sodium Fluoroacetate) Transfer Notice 2005 (*New Zealand Gazette* Issue 92, 17 June 2005) (as amended)).

Three substances containing 1080 are approved for aerial application. These are:

- pellets containing 0.4–0.8 g/kg sodium fluoroacetate
- pellets containing 1.5–2.0 g/kg sodium fluoroacetate
- soluble concentrate containing 200 g/litre sodium fluoroacetate (when mixed with food bait, for example, carrot and grain baits).

For substances containing 1080, the applicants state that, in general, aerial application is used for difficult and/or inaccessible country or operations covering large areas. The Agency notes that some submitters state that they consider that aerial application is used in areas that would be accessible for ground operations. The applicants advise that distribution is generally done using custom-designed bait applicators incorporated into fixed-wing aircraft (modified topdressers) or suspended from helicopters. It is stated in the application that global positioning systems are used to plan the operations and for the aircraft operator to ensure complete coverage and accurate targeting of the areas to be treated.

The timing of aerial applications depends on the pest species targeted. The applicants advise that possums are most likely to take baits during the winter when their preferred food sources are less common. Ship rats are more likely to take baits in winter and spring operations. The applicants state that aerial application of substances containing 1080 can be tied into the nesting habits of native birds; this involves reducing the numbers of pest predator species (particularly ship rats, stoats and possums) immediately before spring, increasing the chance of successful nesting. The applicants specify that aerial application can lead to a control cycle of 4–6 years, and that if the aerial operation is particularly successful, it can extend the cycle to 5–7 years.

Generally, before the application of toxic baits, a non-toxic ‘pre-feed’ is applied to the treatment area. This is a non-toxic feed (such as non-coated carrots or pellets that contain no 1080) in the same form as will be used in the poison operation. Pre-feeds are used to attract and familiarise the pests with the bait.

The applicants advise that the most common substances containing 1080 used for aerial application are the 0.8 g/kg and 1.5 g/kg cereal pellets and carrot baits, and that baits weighing both 6 g and 12 g are used. The applicants advise that the following are typical application rates.

- Two to five kilogram baits/ha with the average being 2–3 kg/ha. The equivalent numbers of baits are 330–830 baits/ha (at 2–5 kg bait/ha) for 6 g baits and 170–420 baits/ha (at 2–5 kg bait/ha) for 12 g baits.
- Where a maximum 1080 concentration of 1.5 g/kg is used, the above application rates equate to approximately 7.5 g 1080/ha for both 6 g and 12 g baits when applied at a rate of 5 kg/ha.

The applicants advise that pellet baits are loaded directly onto the hopper of the helicopter or aircraft from bulk bags. On-site preparation is carried out for coated baits; the carrot or grain is chopped and the stock solution applied directly before being loaded onto the aircraft. Dilution of the stock solution is carried out to achieve the necessary concentration of 1080 in the bait. The Agency notes that further details on the preparation of the coated baits are provided by the Department of Labour (2002). Field preparation of baits involves the application of appropriate dilutions of the 20% stock solution to a known weight of carrots. Preparations include 1–9 or 2–8 dilutions of the stock solution with water to give 2% or 4% solutions. The coated carrot baits are then prepared by spraying 10 L of dilute solution on 1,000 kg of carrot, giving an average level of 1080 in the carrot of 0.02% or 0.04%. The spraying operation is an enclosed process (Department of Labour 2002).

Aerially applied baits are not removed on completion of the operation but are left with the intention that in-situ breakdown of the bait will occur. When baits are distributed in areas with public access, operators clear baits from roads and walkways, a process required for compliance with the conditions of permissions issued by the Ministry of Health via delegation from the Authority.

4.5.3.2 Ground application

During ground operations, 1080 is applied in bait stations, bait bags or applied directly to the ground or vegetation. All substances containing 1080 (with the exception of the stock solution) can be used in ground operations. Bait stations are commonly used during ground operations and are designed and positioned to avoid the exposure of non-target species (including livestock, people, pets and native animals). Commonly used bait stations include the Philproof, KK and Romark models.

Pellets and coated baits

Large bait stations can hold up to 1 kg of pellets, enabling pests to feed over a period of days or weeks. The applicants comment that pellet baits can remain active for several months if protected from the rain. At the end of the operation, the bait stations are removed to prevent bait shyness and sub-lethal poisoning of target pests. Waste baits are either buried or returned to the depot from where they are disposed via a local landfill or disposal company.

Pellets and coated baits may also be applied directly into the ground by hand or by using a mechanical sower in more open country. The applicants advise that to date, mechanical spreaders have been used only in rabbit control operations.

Pastes

Pastes are typically applied using an applicator gun. Pastes are applied into bait stations, onto upturned earth spits, onto retrievable cardboard squares or tin lids, or directly onto vegetation.

Paste bait may be replaced over several days before the spit is turned back to cover the residual paste or the stations retrieved. Residual paste is removed from the stations, and the paste and station disposed of via a local landfill or disposal company.

Tin lids are washed and re-used.

Pastes may also be applied in biodegradable baits bags. The Agency requested clarification from the applicants as to how the bags are presented. The applicants advise that individual operators load the paste into bags. Paste is supplied in 20 L pails and must be transferred into jam guns or mastic guns before being loaded into the bags, so loading of bags is usually done at the depot. The applicants advise that the bags are of a similar texture to waxed paper. The applicants state that bags are loaded with 10–20 g paste in accordance with label instructions. Bags are placed on the ground along travel lines or, most often, are stapled to a tree or post or similar with a flour lure to lure the possums.

Gels

Gels may be applied via bait stations but are generally applied directly onto vegetation so that the target pest ingests the substance along with its food.

4.5.4 Standard operating procedures

HSNO Act requirements specify that personnel involved in the application of 1080 must be approved handlers and hold controlled substances licences (see section 8 for further details). In addition to these requirements, DoC and the AHB have specific internal requirements relating to their operations.

Department of Conservation operations

The applicants state that DoC has standard operating procedures (SOPs) for the safe handling of pesticides that were designed to meet all legal obligations under the Health and Safety in Employment Act 1992, the HSNO Act and other applicable legislation.

The Agency notes that the procedures are intended to address all phases of an operation (including planning, transportation, bait preparation, use of pelleted baits, ground and aerial application methods, post-operational clean up, waste disposal, and accidents and emergencies).

Procedures are mandatory for all staff, contractors and subcontractors operating on DoC land. Some parts of the SOPs are mandatory for contractors undertaking external operations on land managed by DoC.

Personal protective equipment (PPE), including clothing, for the different lifecycle stages and different bait formulations is specified in the SOPs. PPE requirements depend on the risk and type of exposure the worker will be subject to. At a minimum, overalls and gloves are worn whenever 1080 formulations are handled. When large quantities of bait are to be handled (eg, during aerial operations) respirators and eye protection must also be worn.

DoC also has a series of safe handling sheets that are specific to the different substances containing 1080 that DoC uses. The Agency notes that the SOPs for the safe handling of pesticides specify that the sheets must be taken into the field during an operation and copies of the appropriate sheets must be made available to each individual involved in the operation.

Animal Health Board operations

The Agency notes that control operations for the AHB are carried out by contractors and regional councils.

For AHB operations, users must have an SOP that has been approved by the AHB's regional vector managers.

Tb operations are governed by vector control contracting procedures, an AHB initiative.

When AHB operations occur on DoC-administered land, they are also subject to DoC's approval processes. The Agency notes that, under HSNO Act requirements, AHB operations on DoC land require DoC to issue permission for the operation in accordance with section 95A of the HSNO Act. A standard condition applied by DoC to permissions for operations involving 1080 is that the SOPs for the safe handling of pesticides are adhered to. The Agency notes, however, that this requirement is not in place for permissions issued to the AHB. The Agency assumes that this is because the AHB requires the contractor to have their own SOPs for the operation (see section 8.1.2.3 for further details on permission requirements).

The applicants have supplied a copy of a contractor's SOP. The SOP covers topics such as operational planning and approval, requirements for the application of the baits and occupational health and safety.

4.5.5 Disposal of waste generated during an operation

Small quantities of surplus or spoilt bait are either buried or disposed of down an offal hole. The Agency notes that the disposal of hazardous substances in offal holes or farm dumps is subject to regional requirements under the RMA. Consideration is given to the location of the holes relative to watercourses, groundwater, permanent buildings and neighbouring property. HSNO Act tracking regulations require that a record of the disposal is kept for three years from the date of the disposal of the substance.

Large quantities of surplus or spoilt bait are disposed of to landfill (see section 4.5.7) in accordance with local resource consent conditions for the landfill. Again, HSNO Act tracking regulations require that a record of the disposal is kept for three years from the date of the disposal of the substance.

1080 is water soluble, so water is used to wash down equipment at the end of operations. Washing may occur in the field or at the contract or agency depot. Spillages are cleaned up using water. Waste water is disposed of onto the ground rather than directly into a watercourse.

DoC's SOPs requires that all PPE is cleaned before and after use. Clothing is washed weekly by a commercial cleaner. This washing is done separately from any other clothing.

All cardboard and paper packaging (eg, the boxes in which the 1080 formulation is delivered in) is burnt on the contractor's premises or at the operational base, or disposed of via landfill.

4.5.6 1080 in the environment

The applicants advise that in the majority of control operations the applied bait is not retrieved. Access to the treated area is either closed or subject to control measures (eg, through the use of signs or stock-withholding periods) for the duration that the bait remains an active toxin. Baits that are not eaten are left with the intention that they will degrade in the environment.

While control operations are intended to kill a target pest species, non-target species may also be killed (these include native birds, domestic animals (livestock or pets) and other game animals (wild deer, pigs and goats)). Non-target poisoning is discussed in Appendix F.

The carcasses of target and non-target species are not retrieved from the operation site but are left to degrade naturally. There is potential for secondary poisoning (ie, poisoning via a secondary medium) to occur. The applicants state that secondary poisoning can have beneficial effects if the scavenging animal is a pest species, but it also poses a risk to dogs. Secondary poisoning is further discussed in Appendix F.

4.5.7 Landfill disposal

Waste from manufacturing and packaging and spoiled and surplus baits are generally disposed of at landfills. Landfills must be notified of the type of baits or product for disposal in accordance with consent requirements for landfills. Whether a landfill will accept 1080 formulations depends on the conditions of its resource consent. Generally, a landfill will identify and record a specific area for disposal of the substances before their arrival at the site.

4.6 Lifecycle of cyanide and use of traps

The applicants have detailed a future without 1080, indicating that a mixture of trapping and cyanide would be used to control pests. Specific lifecycle details, in terms of manufacture, transport and disposal are difficult to accurately define for this future situation using cyanide, although obviously these lifecycle stages will still be applicable to alternative cyanide baits.

Additionally, the Agency notes that the manufacture, transport and disposal of cyanide formulations will be subject to the same legislation as for 1080 formulations (eg, requirements under the HSNO Act, Health and Safety in Employment Act 1992 and Land Transport Rule: Dangerous Goods 2005 (Rule 45001/1)). The major difference in the lifecycles of 1080 formulations and cyanide formulations lies within the 'use' phase of the lifecycles. The Agency has, therefore, focused on the 'use' phase of the cyanide lifecycle.

Currently, 1080 formulations are the only vertebrate toxic agents that have approval for aerial application, so the applicants propose that all aerial

applications will cease without 1080. The applicants indicate that this will have an impact on the total area on which pest management is carried out.

The Agency notes that the Department of Labour has not set specific workplace exposure standards (WESs) for potassium or sodium cyanide (the two cyanides registered for use as vertebrate toxic agents in New Zealand). However, a WES value for hydrogen cyanide has been set. Occupational exposures are considered in detail in Appendix M.

4.6.1 Substances containing cyanide

In their future scenario, the applicants have advised that cyanide containing formulations will be used as an alternative to 1080. Currently, a range of cyanide-containing formulations are approved for import, manufacture and release under the HSNO Act.

Three cyanide substances were transferred to the HSNO Act on 1 July 2004 (see the Hazardous Substances (Vertebrate Toxic Agents) Transfer Notice 2004 (as amended), *New Zealand Gazette* Issue 141, 29 October 2004). These substances are:

- encapsulated paste containing 500 g/kg potassium cyanide
- encapsulated pellet containing 800 g/kg potassium cyanide
- paste containing 500–600 g/kg sodium cyanide.

After transfer to the HSNO Act, the registrant for ‘encapsulated pellet containing 800 g/kg potassium cyanide’ advised that the manufacture of this substance had been discontinued for reasons relating to efficacy. Subsequently the registrant applied, under Part V of the HSNO Act, for approval of 475 g/kg pellets (approval number HSR001673).

In addition to the transferred substances and the 475 g/kg pellets, a further application was submitted under Part V of the HSNO Act to cover a range of bait formulations consisting of 0.55%–1.84% w/w encapsulated cyanide contained within a non-toxic feed. The approval for ‘bait containing 0.55%–1.84% w/w encapsulated cyanide’ (approval number HSR007628) covers both cereal bait blocks and pastes.

4.6.1.1 Potassium cyanide

Two trade name products containing potassium cyanide are registered with the Agricultural Compounds and Veterinary Medicines Group (ACVM Group). These products are as follows.

- Feratox: Pellets containing encapsulated pellets of cyanide (475 g/kg). This product is manufactured by Connovation Limited and intended for possum control.¹²

¹² See <http://www.nzfsa.govt.nz/acvm-register/labels/V004713-label.pdf> for further details.

- Cynara50 Cyanide Paste: A paste containing 500 g/kg potassium cyanide. This paste bait is manufactured by Connovation Limited and intended for the control of possums. The paste contains micro-encapsulated potassium cyanide.¹³

4.6.1.2 Sodium cyanide

Two trade name products containing sodium cyanide are registered with the ACVM Group. These products are as follows.

- Cyanide Paste for Possum Destruction: A paste containing 500–550 g/kg sodium cyanide. This paste bait is manufactured by ACP and intended for use to control possums.¹⁴
- Trappers Cyanide Paste: A paste bait containing 600 g/kg sodium cyanide. The substance is intended for use to control possums and is applied directly to natural features.

4.6.2 Application of substances containing cyanide

4.6.2.1 Cyanide pellets

Feratox pellets are dispensed using bait stations (pellet feeders) or ready-made paper bait bags. The optimum height for pellet feeders is reported to be approximately 17 cm off the ground (ACVM Group 2002).

Additionally, where livestock have access to the treatment area baits should be placed out of their reach; the ACVM Group (2002) notes that for cattle and horses this means that baits should be placed more than 2 m above the ground. The Agency notes that the product label for Feratox pellets specifies that the baits must be set a minimum of 20 cm above the ground and that the pellet feeders hold up to eight Feratox baits. The product label does not appear to mention the need to place baits out of reach of livestock. Bait bags are stapled to trees or posts by pest-control workers. The Feratox baits can be purchased with or without a non-toxic bait matrix surrounding the potassium cyanide capsule. When baits are purchased without a bait matrix applied, the user applies the bait matrix to the pellets before use.

4.6.2.2 Cyanide pastes

Cynara50 Cyanide Paste is applied via the placement of ready-made paper bait bags containing paste or the placement of the paste in bait stations or on natural features. As with the pellet formulations, where livestock have access to the treatment areas the paste bait must be placed out of their reach (above 2 m where cattle and horses have access). Otherwise, baits may be placed on natural features 10 cm above the ground (ACVM Group 2002). When the substance is applied to natural features, pea-sized spots are applied to the target site, and flour and milk powder are applied around

13 See <http://www.nzfsa.govt.nz/acvm-register/labels/V005623-label1.pdf> for further details.

14 See <http://www.nzfsa.govt.nz/acvm-register/labels/V000707-label.pdf> for further details.

the bait as attractants. The ACVM Group (2002) reports that a ‘pea-sized’ portion of paste bait is equivalent to 0.4 g bait.

The sodium cyanide pastes are applied via ready-made bait bags or through application to natural features, and are recommended for use with a period of pre-feeding. As noted for the potassium cyanide paste and pellets, bait should be placed out of reach of livestock. Pea-sized spots of paste are applied with a thin layer of a lure or light coating of flour as an attractant. Residual paste should be removed or destroyed at the end of the treatment period to avoid sub-lethal poisoning and bait-shyness.

4.6.3 Disposal of substances containing cyanide

The applicants advise that during the normal manufacturing process for the cyanide-containing formulations, a contractor will dispose of the waste. Liquid waste is first neutralised through the addition of sodium hydrochloride and then disposed of via a treatment plant. Solid wastes are disposed of to landfill.

Although not specified by the applicants, the Agency considers that after manufacturing, disposal methods for the surplus and soiled cyanide baits (eg, following an application operation) will be the same as those noted by the applicants for 1080 baits. This involves the disposal of large quantities via landfill and smaller quantities through burial or in offal holes. Disposal directions on the label of Feratox pellets specify that wet and decomposing baits should be buried in at least 60 cm of damp soil.

As with the 1080 formulations, HSNO Act tracking regulations require that a record of the disposal is kept for three years from the date of the disposal of the substance.

4.6.4 Trapping

Although trapping is not a hazardous substance-related method of pest control, it is briefly described below as trapping is proposed as an important method of pest control in the ‘without 1080’ scenario suggested by the applicants.

The applicants advise that commercial operators and some management agencies use traps for the control of possums. Lines of traps secured to trees are set through a specific area where possums travel and on favoured food trees. Lures mixed with flour are used to attract the possum to the trap.

The applicants state that two broad types of trap are used in the management of possums: leg-hold traps and kill traps.

4.6.4.1 Leg-hold traps

The applicants advise that leg-hold traps are the most commonly used traps in commercial operations. Leg-hold traps, such as the Victor-1 traps, hold

4.6 Lifecycle of cyanide and use of traps

but do not kill the animal. There is a legislative requirement that these traps are checked within 12 hours of sunrise on the day after they were set and any trapped possums killed. The applicants state that leg-hold traps, in particular, can kill or maim ground-dwelling birds (eg, kiwi and weka). The traps must be set above the ground when used in areas where these birds are present.

4.6.4.2 Kill traps

The applicants state that kill-traps are less commonly used by commercial operators. Examples of kill traps are the Warrior, Sentinel and Set'n'Forget traps.

5 Hazardous Properties, Thresholds and Classification

5.1 Classification of 1080 and substances containing 1080

The Agency has assessed the information supplied by the applicants and has referred to other data sources in assessing the applicants' hazard profile (see Appendices B and C for the Agency's assessment).

The current hazard profiles for substances containing 1080, the applicants' proposed hazard profiles and the Agency's revised hazard profiles for the substances containing 1080 are listed in Table 5.1. The explanation of the Hazardous Substances and New Organisms Act 1996 (HSNO Act) hazard classification applicable to substances containing 1080 is given directly below Table 5.1.

It is proposed that the Agency's revised hazard profiles be adopted.

Table 5.1: Hazard profiles of substances containing 1080

Substance description and approval number	Trade name products	Current HSNO hazard classification	Applicants' proposed HSNO hazard classification	Agency's revised HSNO hazard classification
Sodium fluoroacetate (1080) HSNO Approval Number: HSR002771	-	6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.3A, 9.4A	6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.2B, 9.3A, 9.4A	6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.2B, 9.3A, 9.4A
Soluble concentrate containing 200 g/litre sodium fluoroacetate HSNO Approval Number: HSR002427	1080 Solution, Stock Solution 1080	6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.3A, 9.4B	6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.2C, 9.3A, 9.4B	6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.2D, 9.3A, 9.4A
Pellets containing 1.5–2.0 g/kg sodium fluoroacetate HSNO Approval Number: HSR002424	0.15% 1080 Pellets, 0.2% 1080 Pellets	6.1B, 6.8A, 9.1D, 9.3A	6.1B, 6.8A, 9.1C, 9.3A	6.1B, 6.8A, 9.1D, 9.3A
Pellets containing 1.0 g/kg sodium fluoroacetate HSNO Approval Number: HSR002423	0.1% 1080 Feral Cat Bait	6.1C, 6.8A, 9.1D, 9.3B	6.1C, 6.8A, 9.1C, 9.3B	6.1C, 6.8A, 9.1D, 9.3B
Pellets containing 0.4–0.8 g/kg sodium fluoroacetate HSNO Approval Number: HSR002422	0.04% 1080 Pellets, 0.06% 1080 Pellets, 0.08% 1080 Pellets, 0.08% 1080 Rodent Pellets	6.1C, 9.3B	6.1C, 9.1C, 9.3B	6.1C, 9.1D, 9.3B
Paste containing 10 g/kg sodium fluoroacetate HSNO Approval Number: HSR002425	1.0% 1080 Wasp Paste	6.1B, 6.8A, 6.9B, 9.1D, 9.3A, 9.4C	6.1B, 6.8A, 6.9B, 9.1C, 9.2C, 9.3A, 9.4B	6.1B, 6.8A, 6.9B, 9.1D, 9.3A, 9.4A

5.1 Classification of 1080 and substances containing 1080

Substance description and approval number	Trade name products	Current HSNO hazard classification	Applicants' proposed HSNO hazard classification	Agency's revised HSNO hazard classification
Paste containing 1.5 g/kg sodium fluoroacetate HSNO Approval Number: HSR002421	Pestoff Professional 1080 Possum Paste 0.15%, Pestoff Exterminator Paste (0.15%)	6.1B, 6.8A, 9.1D, 9.3A	6.1B, 6.8A, 9.1C, 9.3A	6.1B, 6.8A, 9.1D, 9.3A
Paste containing 0.6–0.8 g/kg sodium fluoroacetate HSNO Approval Number: HSR002420	Pestoff Professional 1080 Possum and rabbit Paste 0.06%, Pestoff Professional 1080 Possum Paste 0.08%	6.1C, 9.3B	6.1C, 9.1C, 9.3B	6.1C, 9.1D, 9.3B
Gel containing 50 g/kg sodium fluoroacetate HSNO Approval Number: HSR002418	5% 1080 Gel	6.1A, 6.8A, 6.9B, 9.1D, 9.3A, 9.4B	6.1A, 6.8A, 6.9B, 9.1C, 9.2C, 9.3A, 9.4B	6.1A, 6.8A, 6.9B, 9.1A, 9.3A, 9.4A
Gel containing 100 g/kg sodium fluoroacetate HSNO Approval Number: HSR002426	10% 1080 Gel	6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.3A, 9.4B	6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.2C, 9.3A, 9.4B	6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.2D, 9.3A, 9.4A
Gel containing 1.5 g/kg sodium fluoroacetate HSNO Approval Number: HSR 002419	No Possums 1080 Gel Bait	6.1B, 6.5B, 6.8A, 9.1D, 9.3A	6.1B, 6.5B, 6.8A, 9.1D, 9.3A	6.1B, 6.8A, 9.1D, 9.3A

Explanation of HSNO hazard classification codes

HSNO classification	Description of hazardous property
6.1A	Acutely toxic
6.1B	Acutely toxic
6.1C	Acutely toxic
6.3B	Mildly irritating to the skin
6.4A	Irritating to the eye
6.5B	Contact sensitiser
6.8A	Known or presumed human reproductive or developmental toxicant
6.9A	Toxic to human target organs or systems
6.9B	Harmful to human target organs or systems
9.1A	Very ecotoxic in the aquatic environment
9.2C	Harmful in the aquatic environment
9.1D	Slightly harmful in the aquatic environment
9.2A	Very ecotoxic in the soil environment
9.2C	Harmful in the soil environment
9.2D	Slightly harmful in the soil environment
9.3A	Very ecotoxic to terrestrial vertebrates
9.3B	Ecotoxic to terrestrial vertebrates
9.4A	Very ecotoxic to terrestrial invertebrates
9.4B	Ecotoxic to terrestrial invertebrates

There are differences between the current hazard profile, the applicants' proposed hazard profile and the Agency's revised hazard profile.

- With regard to toxicity classifications there is agreement. The Agency is proposing the removal of the current 6.5B contact sensitisation classification from the substance ‘gel containing 1.5 g/kg sodium fluoroacetate’. The reasoning behind this proposal is that the component triggering this classification in this substance is present at a very low concentration.
- With regard to ecotoxicity classifications, there are a greater number of differences between the current hazard profile, the applicants’ proposed hazard profile and the Agency’s revised hazard profile. These differences are explained in Appendix C.

The risk assessment detailed in section 7 of this report is based on the Agency’s revised hazard profile.

5.2 Classification of substances containing cyanide

The hazard profiles of substances containing cyanide that are currently approved under the HSNO Act are detailed in Table 5.2. The explanation of the HSNO Act hazard classification applicable to vertebrate toxic agents containing cyanide is given directly below Table 5.2.

Table 5.2: Hazard profiles of vertebrate toxic agents containing cyanide

Substance description and HSNO approval number	Trade name products	HSNO hazard classifications
Encapsulated paste containing 500 g/kg potassium cyanide HSNO Approval Number: HSR001607	Cynara50 Cyanide Paste	6.1B, 6.3B, 6.4A, 6.5B, 6.8B, 6.9A, 9.1A, 9.2A, 9.3A, 9.4A
Encapsulated pellet containing 800 g/kg potassium cyanide HSNO Approval Number: HSR001608	Currently no trade name products registered under the Agricultural Compounds and Veterinary Medicines Act 1997	
Paste containing 500–600 g/kg sodium cyanide HSNO Approval Number: HSR001606	Cyanide Paste for Possum Destruction Trappers Cyanide Paste	6.1A, 6.3B, 6.4A, 6.5B, 6.8B, 6.9A, 9.1A, 9.2A, 9.3A, 9.4A
Feratox 475 g/kg HSNO Approval Number: HSR001673	Feratox pellets containing 475 g/kg potassium cyanide	6.1B, 6.3B, 6.4A, 6.5B, 6.8B, 6.9A, 9.1A, 9.2A, 9.3A, 9.4A
Bait containing 0.55%–1.84% w/w encapsulated cyanide HSNO Approval Number: HSR007628	Covers a range of Feratox baits containing Feratox pellets of 475 g/kg potassium cyanide encased in a non-toxic feed	6.1C, 6.8B, 6.9B, 9.1D, 9.2D, 9.3A, 9.4A
Potassium cyanide HSNO Approval Number: HSR002741		6.1A, 6.3B, 6.4A, 6.5B, 6.8B, 6.9A, 8.1A, 9.1A, 9.2A, 9.3A, 9.4A
Sodium cyanide HSNO Approval Number: HSR002740		

5.2 Classification of substances containing cyanide

Explanation of HSNO hazard classification codes

HSNO classification	Description of hazardous property
6.1A	Acutely toxic
6.1B	Acutely toxic
6.1C	Acutely toxic
6.3B	Mildly irritating to the skin
6.4A	Irritating to the eye
6.5B	Contact sensitiser
6.8B	Suspected human reproductive or developmental toxicant
6.9A	Toxic to human target organs or systems
6.9B	Harmful to human target organs or systems
8.1A	Corrosive to metals
9.1A	Very ecotoxic in the aquatic environment
9.1D	Slightly harmful in the aquatic environment
9.2A,	Very ecotoxic in the soil environment
9.2D	Slightly harmful in the soil environment
9.3A	Very ecotoxic to terrestrial vertebrates
9.4A	Very ecotoxic to terrestrial invertebrates

Note that while the hazard profile of ‘bait containing 0.55%–1.84% w/w encapsulated cyanide’ is significantly reduced compared with the Feratox 475 g/kg pellet, the formulation of ‘bait containing 0.55%–1.84% w/w encapsulated cyanide’ is based on Feratox 475 g/kg pellets surrounded in a non-toxic bait matrix. Each encapsulated pellet contains the same quantity of potassium cyanide regardless of whether it is presented as a single pellet or as a pellet surrounded by a bait matrix. Consequently, the risks associated with these two substances are considered to be similar and the same controls (based on the hazard profile for Feratox 475 g/kg) were applied to both approvals.

6 Existing Controls

6.1 Introduction

The lifecycle and hazardous properties of 1080 and substances containing 1080 are managed through a variety of controls. These controls are prescribed as part of the approval of these substances under the Hazardous Substances and New Organisms Act 1996 (HSNO Act) and Agricultural Compounds and Veterinary Medicines Act 1997 (ACVM Act), and through requirements for resource consents under the Resource Management Act 1991.

Sections 6.2 and 6.3 detail the requirements of the HSNO Act and summarise the non-HSNO Act requirements.

6.2 Controls applied under the HSNO Act

6.2.1 Hazardous substances regulations and *New Zealand Gazette* notices

The controls applicable to 1080 and substances containing 1080 are given in the following regulations made pursuant to the HSNO Act and the following *New Zealand Gazette* notices. In addition, transitional controls also apply until the end of the relevant transitional period (see section 6.2.1.3).

- Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001: Controls to manage the toxic (Class 6), corrosive (Class 8) and ecotoxic (Class 9) properties of a substance, including exposure limits.
- Hazardous Substances (Identification) Regulations 2001: In effect, requirements for labelling, material safety data sheets and workplace information, and advertising.
- Hazardous Substances (Packaging) Regulations 2001: Standards for packaging for specific hazard classes.
- Hazardous Substances (Disposal) Regulations 2001: Information that must be provided in relation to the disposal of specific classes of hazardous substance and packaging.
- Hazardous Substances (Emergency Management) Regulations 2001: Information requirements for the suppliers and people in charge of places. The requirements are set on the basis of the quantities of specific hazard classes on a site, with higher-level requirements for larger quantities and the higher hazard substances.
- Hazardous Substances (Tracking) Regulations 2001: The classes of hazardous substance that have to be under the control of an approved handler, and what records must be kept and for how long.
- Hazardous Substances (Personnel Qualifications) Regulations 2001: The requirements for test certificates for approved handlers and

qualifications for enforcement officers. This regulation also specifies the transitional arrangements for existing licence holders.

- Schedule 8 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 (as amended).
- Hazardous Substances (Sodium Fluoroacetate) Transfer Notice 2005 (*New Zealand Gazette* Issue 92, 17 June 2005) (as amended).
- Hazardous Substances (Chemicals) Transfer Notice 2006 (*New Zealand Gazette* Issue 72, 28 June 2006).

6.2.1.1 Hazardous substances regulations

Table 6.1 summarises the HSNO Act control codes¹⁵ that apply to 1080 and the approved substances containing 1080. The HSNO control codes are based on the classifications assigned to the substances (as determined at the time of transfer to the HSNO Act).

Table 6.1: HSNO Act control codes for 1080 and substances containing 1080

Substance description	HSNO Act control codes based on classifications
Sodium fluoroacetate	Toxic
CAS number 62-74-8	T1, T2, T4, T5, T6, T7
HSNO Approval Number: HSR002771	Ecotoxic
	E1
	Identification
	I1, I3, I8, I9, I11, I16, I17, I18, I19, I20, I21, I23, I28, I29, I30
	Packaging and Packing Group
	P1, P3, P13
	PG1
	Disposal
	D4, D5, D6, D7, D8
	Emergency Management
	EM1, EM6, EM7, EM8, EM11, EM13
	Approved Handler and Tracking
	AH1, TR1

¹⁵ Control codes are codes ERMA New Zealand has assigned to enable easy cross-referencing to the regulations. These codes are detailed in ERMA New Zealand (2001).

Substance description	HSNO Act control codes based on classifications
<p>Soluble concentrate containing 200 g/litre sodium fluoroacetate</p> <p>HSNO Approval Number: HSR002427</p> <p>Includes the following trade name products:</p> <p>V002189 1080 Solution</p>	<p>Toxic</p> <p>T1, T2, T3, T4, T5, T6, T7, T8</p> <p>Ecotoxic</p> <p>E1, E2, E3, E4, E5, E6, E7</p> <p>Identification</p> <p>I1, I3, I8, I9, I11, I16, I17, I18, I19, I20, I21, I23, I28, I29, I30</p> <p>Packaging and Packing Group</p> <p>P1, P3, P13</p> <p>PG1</p> <p>Disposal</p> <p>D4, D5, D6, D7, D8</p> <p>Emergency Management</p> <p>EM1, EM6, EM7, EM8, EM11, EM12, EM13</p> <p>Approved Handler and Tracking</p> <p>AH1, TR1</p>
<p>Pellets containing 0.4–0.8 g/kg sodium fluoroacetate</p> <p>HSNO Approval Number: HSR002422</p> <p>Includes the following trade name products:</p> <p>V003785 0.04% 1080 Pellets</p> <p>V000825 0.06% 1080 Pellets</p> <p>V002829 0.08% 1080 Pellets</p> <p>V009015 0.08% 1080 Rodent Pellets</p>	<p>Toxic</p> <p>T1, T2, T3, T4, T5, T6, T7, T8</p> <p>Ecotoxic</p> <p>E1, E2, E4, E6</p> <p>Identification</p> <p>I1, I3, I8, I9, I11, I16, I17, I18, I19, I20, I21, I23, I28, I29, I30</p> <p>Packaging and Packing Group</p> <p>P1, P3, P13</p> <p>PG3</p> <p>Disposal</p> <p>D4, D5, D6, D7, D8</p> <p>Emergency Management</p> <p>EM1, EM6, EM7, EM8, EM11, EM13</p> <p>Tracking and Approved Handler</p> <p>AH1, TR1</p>
<p>Pellets containing 1.0 g/kg sodium fluoroacetate</p> <p>HSNO Approval Number: HSR002423</p> <p>Includes the following trade name product:</p> <p>V004107 0.01% 1080 Feral cat bait</p>	<p>Toxic</p> <p>T1, T2, T3, T4, T5, T6, T7, T8</p> <p>Ecotoxic</p> <p>E1, E2, E4, E6</p> <p>Identification</p> <p>I1, I3, I8, I9, I11, I16, I17, I18, I19, I20, I21, I23, I28, I29, I30</p> <p>Packaging and Packing Group</p> <p>P1, P3, P13</p> <p>PG3</p> <p>Disposal</p> <p>D4, D5, D6, D7, D8</p> <p>Emergency Management</p> <p>EM1, EM6, EM7, EM8, EM11, EM13</p> <p>Tracking and Approved Handler</p> <p>AH1, TR1</p>

6.2 Controls applied under the HSNO Act

Substance description	HSNO Act control codes based on classifications
<p>Pellets containing 1.5–2.0 g/kg sodium fluoroacetate</p> <p>HSNO Approval Number: HSR002424</p> <p>Includes the following trade name products:</p> <p>V002538 0.2% 1080 Pellets</p> <p>V002848 0.15% 1080 Pellets</p>	<p>Toxic</p> <p>T1, T2, T3, T4, T5, T6, T7, T8</p> <p>Ecotoxic</p> <p>E1, E2, E4, E5, E6, E7</p> <p>Identification</p> <p>I1, I3, I8, I9, I11, I16, I17, I18, I19, I20, I21, I23, I28, I29, I30</p> <p>Packaging and Packing Group</p> <p>P1, P3, P13</p> <p>PG2</p> <p>Disposal</p> <p>D4, D5, D6, D7, D8</p> <p>Emergency Management</p> <p>EM1, EM6, EM7, EM8, EM11, EM13</p> <p>Approved Handler and Tracking</p> <p>AH1, TR1</p>
<p>Gel containing 1.5 g/kg sodium fluoroacetate</p> <p>HSNO Approval Number: HSR002419</p> <p>Includes the following trade name product:</p> <p>V005377 No Possums 1080 Gel Bait</p>	<p>Toxic</p> <p>T1, T2, T3, T4, T5, T6, T7, T8</p> <p>Ecotoxic</p> <p>E1, E2, E4, E5, E6, E7</p> <p>Identification</p> <p>I1, I3, I8, I9, I11, I16, I17, I18, I19, I20, I21, I23, I28, I29, I30</p> <p>Packaging and Packing Group</p> <p>P1, P3, P13</p> <p>PG2</p> <p>Disposal</p> <p>D4, D5, D6, D7, D8</p> <p>Emergency Management</p> <p>EM1, EM6, EM7, EM8, EM11, EM13</p> <p>Tracking and Approved Handler</p> <p>AH1, TR1</p>
<p>Gel containing 50 g/kg sodium fluoroacetate</p> <p>HSNO Approval Number: HSR002418</p> <p>Includes the following trade name product:</p> <p>V003623 5% 1080 Gel</p>	<p>Toxic</p> <p>T1, T2, T3, T4, T5, T6, T7, T8</p> <p>Ecotoxic</p> <p>E1, E2, E3, E4, E5, E6, E7</p> <p>Identification</p> <p>I1, I3, I8, I9, I11, I16, I17, I18, I19, I20, I21, I23, I28, I29, I30</p> <p>Packaging and Packing Group</p> <p>P1, P3, P13</p> <p>PG1</p> <p>Disposal</p> <p>D4, D5, D6, D7, D8</p> <p>Emergency Management</p> <p>EM1, EM6, EM7, EM8, EM11, EM13</p> <p>Tracking and Approved Handler</p> <p>AH1, TR1</p>

Substance description	HSNO Act control codes based on classifications
<p>Gel containing 100 g/kg sodium fluoroacetate</p> <p>HSNO Approval Number: HSR002426</p> <p>Includes the following trade name product: V002554 10% 1080 Gel</p>	<p>Toxic T1, T2, T3, T4, T5, T6, T7, T8</p> <p>Ecotoxic E1, E2, E3, E4, E5, E6, E7</p> <p>Identification I1, I3, I8, I9, I11, I16, I17, I18, I19, I20, I21, I23, I28, I29, I30</p> <p>Packaging and Packing Group P1, P3, P13 PG1</p> <p>Disposal D4, D5, D6, D7, D8</p> <p>Emergency Management EM1, EM6, EM7, EM8, EM11, EM13</p> <p>Tracking and Approved Handler AH1, TR1</p>
<p>Paste containing 0.6–0.8 g/kg sodium fluoroacetate</p> <p>HSNO Approval Number: HSR002420</p> <p>Includes the following trade name products: V004811 Pestoff Professional 1080 Possum Paste 0.06% V004812 Pestoff Professional 1080 Possum Paste 0.08%</p>	<p>Toxic T1, T2, T3, T4, T5, T6, T7, T8</p> <p>Ecotoxic E1, E2, E4, E6</p> <p>Identification I1, I3, I8, I9, I11, I16, I17, I18, I19, I20, I21, I23, I28, I29, I30</p> <p>Packaging and Packing Group P1, P3, P13 PG3</p> <p>Disposal D4, D5, D6, D7, D8</p> <p>Emergency Management EM1, EM6, EM7, EM8, EM11, EM13</p> <p>Tracking and Approved Handler AH1, TR1</p>
<p>Paste containing 1.5 g/kg sodium fluoroacetate</p> <p>HSNO Approval Number: HSR002421</p> <p>Includes the following trade name product: V004918 Pestoff Professional 1080 Possum Paste 0.15%</p>	<p>Toxic T1, T2, T3, T4, T5, T6, T7, T8</p> <p>Ecotoxic E1, E2, E4, E5, E6, E7</p> <p>Identification I1, I3, I8, I9, I11, I16, I17, I18, I19, I20, I21, I23, I28, I29, I30</p> <p>Packaging and Packing Group P1, P3, P13 PG2</p> <p>Disposal D4, D5, D6, D7, D8</p> <p>Emergency Management EM1, EM6, EM7, EM8, EM11, EM13</p> <p>Tracking and Approved Handler AH1, TR1</p>

6.2 Controls applied under the HSNO Act

Substance description	HSNO Act control codes based on classifications
Paste containing 10 g/kg sodium fluoroacetate	Toxic T1, T2, T3, T4, T5, T6, T7, T8
HSNO Approval Number: HSR002425	Ecotoxic E1, E2, E3, E4, E5, E6, E7
Includes the following trade name product:	Identification I1, I3, I8, I9, I11, I16, I17, I18, I19, I20, I21, I23, I28, I29, I30
P003660 1.0% 1080 Wasp Paste	Packaging and Packing Group P1, P3, P13 PG1 Disposal D4, D5, D6, D7, D8 Emergency Management EM1, EM6, EM7, EM8, EM11, EM13 Tracking and Approved Handler AH1, TR1

The following section provides a summary description of the HSNO Act control codes listed in Table 6.1 and refers to the corresponding regulations and clauses. When the control has been varied from that set out in the regulations, when applied to 1080 or the substances containing 1080, an asterisk (*) has been placed next to the control code.

The HSNO control codes applicable to 1080 and the substances containing 1080 can be broken down into those controls that manage the hazardous properties of the substances (see Table 6.2) and those that manage the lifecycles of the substances (see Table 6.3).

- **Hazardous property** controls are designed to manage the hazards arising from a substance’s intrinsic hazardous properties, reduce the likelihood of unintended occurrence of the hazard, and limit the adverse effects arising from exposure to the hazard.
- **Lifecycle** controls focus on the lifecycle management of the substances and cover packaging, identification, emergency management, disposal, tracking, and the competency of people handling highly hazardous substances.

A detailed description of each hazardous property and lifecycle control currently applying to substances containing 1080 is in Appendix L.

Table 6.2: Controls managing the hazardous properties of substances containing 1080

Code	Regulation	Control
Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001		
Code T1	Regulations 11–27	Limiting exposure to toxic substances through the setting of tolerable exposure limits
Code T2	Regulations 29, 30	Controlling exposure in places of work through the setting of workplace exposure standards
Code T3	Regulations 5(1), 6	Requirements for keeping records of use
Code T4	Regulation 7	Requirements for equipment used to handle substances

Code	Regulation	Control
Code T5	Regulation 8	Requirements for protective clothing and equipment
Code T6*	Regulation 9	Approved handler and security requirements for certain toxic substances
Code T7	Regulation 10	Restrictions on the carriage of toxic or corrosive substances on passenger service vehicles
Code T8*	Regulation 28	Controls for vertebrate poisons
Code E1	Regulations 32–45	Limiting exposure to ecotoxic substances through the setting of environmental exposure limits
Code E2*	Regulations 46–48	Restrictions on the use of substances in application areas
Code E3	Regulation 49	Controls relating to the protection of terrestrial invertebrates (eg, beneficial insects)
Code E4*	Regulations 50, 51	Controls relating to the protection of terrestrial vertebrates
Code E5	Regulations 5(2), 6	Requirements for keeping records of use
Code E6	Regulation 7	Requirements for equipment used to handle substances
Code E7*	Regulation 9	Approved handler and security requirements for certain ecotoxic substances

* The control has been varied from that set out in the regulations.

Table 6.3: Controls managing the lifecycles of substances containing 1080

Code	Regulation (or Schedule)	Control
Hazardous Substances (Packaging) Regulations 2001		
Code P1	Regulations 5, 6, 7(1), 8	General packaging requirements
Code P3	Regulation 9	Criteria that allow substances to be packaged to a standard not meeting Packing Group I, II or III criteria
Code P13*	Regulation 19	Packaging requirements for toxic substances
Code PG1	Schedule 1	Packaging requirements equivalent to UN Packing Group I
Code PG2	Schedule 2	Packaging requirements equivalent to UN Packing Group II
Hazardous Substances (Disposal) Regulations 2001		
Code D4	Regulation 8	Disposal requirements for toxic and corrosive substances
Code D5	Regulation 9	Disposal requirements for ecotoxic substances
Code D6	Regulation 10	Disposal requirements for packages
Code D7	Regulations 11, 12	Information requirements for manufacturers, importers and suppliers, and persons in charge
Code D8	Regulations 13, 14	Documentation requirements for manufacturers, importers and suppliers, and persons in charge
Hazardous Substances (Personnel Qualifications) Regulations 2001		
Code AH1	Regulations 4–6	Approved handler requirements (including test certificate and qualification requirements)
Hazardous Substances (Tracking) Regulations 2001		
Code TR1*	Regulations 4(1), 5, 6	General tracking requirements
Hazardous Substances (Emergency Management) Regulations 2001		
Code EM1	Regulations 6, 7, 9–11	Level 1 information requirements for suppliers and persons in charge
Code EM6	Regulation 8(e)	Information requirements for toxic substances
Code EM7	Regulation 8(f)	Information requirements for ecotoxic substances
Code EM8	Regulations 12–16, 18–20	Level 2 information requirements for suppliers and persons in charge
Code EM11	Regulations 25–34	Level 3 emergency management requirements: duties of person in charge, emergency response plans
Code EM12	Regulations 35–41	Level 3 emergency management requirements: secondary containment
Code EM13	Regulation 42	Level 3 emergency management requirements: signage

6.2 Controls applied under the HSNO Act

Code	Regulation (or Schedule)	Control
Hazardous Substances (Identification) Regulations 2001		
Code I1	Regulations 6, 7, 32–35, 36(1)–(7)	Identification requirements, duties of persons in charge, accessibility, comprehensibility, clarity and durability
Code I3	Regulation 9	Priority identifiers for ecotoxic substances
Code I8	Regulation 14	Priority identifiers for toxic substances
Code I9	Regulation 18	Secondary identifiers for all hazardous substances
Code I11	Regulation 20	Secondary identifiers for ecotoxic substances
Code I16	Regulation 25	Secondary identifiers for toxic substances
Code I17	Regulation 26	Use of generic names
Code I18	Regulation 27	Requirements for using concentration ranges
Code I19	Regulations 29–31	Additional information requirements, including situations where substances are in multiple packaging
Code I20	Regulation 36(8)	Durability of information for class 6.1 substances
Code I21	Regulations 37–39, 47–50	General documentation requirements
Code I23	Regulation 41	Specific documentation requirements for ecotoxic substances
Code I28	Regulation 46	Specific documentation requirements for toxic substances
Code I29	Regulations 51, 52	Signage requirements
Code I30	Regulation 53	Advertising corrosive and toxic substances

* The control has been varied from that set out in the regulations.

6.2.1.2 *New Zealand Gazette* notice controls

In addition to the controls prescribed by regulation, additional controls are gazetted in notices in the *New Zealand Gazette*. At the time of the transfer of substances containing 1080 to the HSNO Act, additional controls were applied to these substances (as provided for in section 160B of the HSNO Act) and set out in Schedule 3 of the Hazardous Substances (Sodium Fluoroacetate) Transfer Notice 2005. These additional controls are listed in Table 6.4.

Stationary container systems

Additional controls for stationary container systems apply only to the soluble concentrate containing 200 g/litre sodium fluoroacetate. These controls are set out in Schedule 8 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 (*New Zealand Gazette* Issue 35, 26 March 2004, as amended by Issue 128, 30 September 2004, by Issue 208, 15 December 2005, by Issue 70, 27 June 2006, and by Issue 76, 30 June 2006).

Table 6.4: Additional HSNO Act controls applied to substances containing 1080

Schedule 3 of the Hazardous Substances (Sodium Fluoroacetate) Transfer Notice 2005	
Clause 1	<p>Packaging of substances for sale for vertebrate pest control</p> <ol style="list-style-type: none"> (1) No person may pack this substance for sale for vertebrate pest control unless the package is marked with a unique identifier. (2) The unique identifier marked on the package must comply with regulation 35 and regulation 36 of the Hazardous Substance (Identification) Regulations 2001. (3) For the purposes of regulation 35(3)(c) of those regulations, the unique identifier is a secondary identifier. (4) In this clause package means the smallest package in which the relevant substance is sold.
Clause 2	<p>Restrictions on supply and acquisition of substances</p> <ol style="list-style-type: none"> (1) This clause applies to this substance. (2) No person may sell or otherwise supply this substance to any person unless the person has a licence in accordance with clause 4. (3) No person may purchase or otherwise acquire this substance unless the person is a person specified in subclause (2).
Clause 3	<p>Permissions required for application or use of substances</p> <ol style="list-style-type: none"> (1) No person may apply or otherwise use this substance on land administered or managed by the Department of Conservation unless the person first obtains a permission under section 95A of the Act from the Authority. (2) No person may apply or otherwise use this substance in a catchment area from which water is drawn for human consumption or in any other area where a risk to public health may be created if the substance is applied or used unless the person first obtains a permission under section 95A of the Act from the Authority. <p><i>Note: The Authority has delegated the giving of such a permission in the case of subclause (1) to the Department of Conservation, and, in the case of subclause (2) to the Ministry of Health.</i></p>
Clause 4	<p>Licence required for possession of substances</p> <ol style="list-style-type: none"> (1) No person may possess this substance unless the person has a licence under section 95B of the Act from the Authority that is obtained before the person takes possession of the substance. (2) Despite subclause (1), a person who does not have a licence may possess a hazardous substance if— <ol style="list-style-type: none"> (a) the person is under the immediate supervision of a person who has a licence in accordance with this clause; or (b) the person is deemed to comply with Regulation 9 of the Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001 by regulation 9A of those regulations (as inserted by Schedule 2 of the Sodium Fluoroacetate Transfer Notice). <p><i>Note: The licence referred to in subclause (1) is a controlled substances licence. Further details are provided later in this section.</i></p>
Clause 5	<p>Restriction on aerial application of certain substances</p> <p><i>This clause applies only to substances that are approved for aerial application, namely:</i></p> <ul style="list-style-type: none"> • pellets containing 0.4–0.8 g/kg sodium fluoroacetate • pellets containing 1.5–2.0 g/kg sodium fluoroacetate • soluble concentrate containing 200 g/litre sodium fluoroacetate (when mixed with food bait). <ol style="list-style-type: none"> (1) No person may apply, or engage another person to apply, this substance by aerial application unless— <ol style="list-style-type: none"> (a) aerial application is a permitted method of release for that substance in accordance with clause 1 of Schedule 6 [as reproduced under code E4 in Table 6.2]; and (b) the person has a permission or permissions (as the case may be) granted in accordance with clause 3 [see above]; and (c) a copy of each permission is supplied to the pilot of the aircraft; and

Schedule 3 of the Hazardous Substances (Sodium Fluoroacetate) Transfer Notice 2005

- (d) the person has given public notice in a newspaper available in the areas in which the substance will be applied of the proposed aerial application in accordance with subclause (2); and
 - (e) the substance is applied no more than 2 months after the date of the public notice referred to in paragraph (c); and
 - (f) if the person is not the occupier of the area over which the substance will be applied, the person has given notice of the proposed aerial application to the officer in charge of the police station that is nearest to the application area.
- (2) The public notice referred to in subclause (1)(d) must—
- (a) be given with sufficient prior notification, but no more than 2 months, before the proposed aerial application; and
 - (b) specify the following:
 - (i) the approximate date on which the substance will be applied;
 - (ii) the name and nature of the substance;
 - (iii) a description of the area over which the substance will be applied, including—
 - (A) the boundaries of the area; and
 - (B) districts, roads, and other commonly known features that may identify the place;
 - (iv) the location or locations where members of the public may view maps of the area over which the substance will be applied, and the times when such maps may be viewed;
 - (v) the name and address of the person responsible for the application of the substance.

Note the following error in the Gazette notice: Clause 1(e) should refer to paragraph (d) rather than paragraph (c)

Clause 6

Requirements for aircraft carrying out aerial application

This clause applies only to substances that are approved for aerial application, namely:

- pellets containing 0.4–0.8 g/kg sodium fluoroacetate
 - pellets containing 1.5–2.0 g/kg sodium fluoroacetate
 - soluble concentrate containing 200 g/litre sodium fluoroacetate (when mixed with food bait).
- (1) An aircraft that is carrying out an aerial application must not, when flying to or from the area where this substance is applied, fly over a—
- (a) place specified (if any) in a permission granted in relation to the substance in accordance with clause 3 as being a place over which such an aircraft must not fly; or
 - (b) public drinking water supply; or
 - (c) waterway that is less than 100 metres upstream of a point of extraction from a water source for a drinking water supply (not being a water supply exclusively for stock).
- (2) Every aircraft that has carried out an aerial application, and all equipment used in connection with the aerial application, must be decontaminated before the aircraft or equipment is—
- (a) used for another purpose; or
 - (b) removed from a place from which the application operation has been carried out.
- (3) When an aerial application being carried out on a day has ceased for that day, the loading area, and any area where the substance is stored in preparation for loading the substance on to or into the aircraft, must be—
- (a) decontaminated; or
 - (b) fenced so that—
 - (i) people do not inadvertently enter the area; and
 - (ii) stock cannot gain access to the area.
- (4) An area that is fenced in accordance with subclause (3)(b) must have signs erected at the perimeter of the fence in accordance with subclause (5).
- (5) The signs referred to in subclause (4) must—
- (a) state that people and stock should stay out of the area until the signs, and any fence around the area, have been removed; and

Schedule 3 of the Hazardous Substances (Sodium Fluoroacetate) Transfer Notice 2005

- (b) identify the person responsible for the place, and provide sufficient information to enable the person to be contacted during normal business hours; and
- (c) identify the substance and state that it is toxic to human beings and ecotoxic to other vertebrates; and
- (d) comply with regulations 34 and 35 of the Hazardous Substances (Identification) Regulations 2001, except that regulation 35 applies as follows:
 - (i) in relation to the information required to be included on the signs by paragraphs (a) and (b), as if the distances referred to in regulation 35(3)(c) of those regulations were a distance of not less than 2 metres; and
 - (ii) in relation to the information required to be included on the signs by paragraph (c), as if the distances referred to in regulation 35(3)(c) of those regulations were a distance of not less than 10 metres.
- (6) The signs and the fence required by this clause must remain in place until the place is decontaminated.

Interpretation

aerial application means application from an aircraft.

aircraft has the meaning given to it by section 2 of the Civil Aviation Act 1990.

public drinking water supply includes drinking water supply reservoirs, treatment plants and storage facilities

Clause 7	<p>Lost, spilt, or unintended application of substances</p> <p>If this substance is applied other than in the intended application area, or is lost or spilt, the person who is in possession of the substance at the time that it was misapplied, lost, or spilt must report the nature and quantity of the substance within 24 hours of the substance being misapplied, lost, or spilt to—</p> <ul style="list-style-type: none"> (a) if a permission was granted in accordance with clause 3 to apply or otherwise use the substance, the person who granted the permission; and (b) the officer in charge of the nearest police station to which the person has access; and (c) the nearest Medical Officer of Health or the Medical Officer of Health in whose region the substance was misapplied, lost, or spilt; and (d) each owner or occupier of land on which the substance may have been misapplied, lost, or spilt; and (e) the person on whose behalf the substance is being applied.
Clause 8	<p>Unauthorised persons to stay clear of application area of substances</p> <ul style="list-style-type: none"> (1) A person who is not lawfully assisting in the application or use of this substance must not remain in the vicinity of the application or use of the substance (as the case may be). (2) An enforcement officer may order a person who contravenes subclause (1) to immediately leave the area in which the substance is being applied or used

Hazardous Substances (Chemicals) Transfer Notice 2006, Schedule 3, Clause 4

For Sodium fluoroacetate CAS number 62-74-8, information must be provided to the Authority on the identity of any impurity, its origin, and the nature of its relationship to the active component when the impurity is present at a concentration of 10 g/kg or more.

6.2.1.3 Transitional controls

Schedule 4 of the Hazardous Substance (Sodium Fluoroacetate) Transfer Notice 2005 sets out the transitional controls for substances transferred to the HSNO Act via this notice. These transitional controls provide a transitional period to allow manufacturers, importers, suppliers and persons otherwise dealing with sodium fluoroacetate, to comply with the HSNO Act and the controls under the Act. Note that these transitional provisions apply only to persons, substances and locations that were compliant with the requirements in place before the transfer of the substances. The transitional controls in Table 6.5 are still applicable.

Table 6.5: Transitional controls still applicable

Date	Control
1 May 2007	All people who require a licence under section 95B must have a full licence.
1 July 2007	All people must comply with: <ul style="list-style-type: none"> regulations 6–16, 18–20 and 42 of the Hazardous Substances (Emergency Management) Regulations 2001 regulations 11–14 of the Hazardous Substances (Disposal) Regulations 2001 the Hazardous Substances (Packaging) Regulations 2001 the Hazardous Substances (Identification) Regulations 2001.

6.2.1.4 Further explanation of HSNO Act controls

The Agency considers some controls (including hazardous property, lifecycle and *Gazette* notice controls) applied to 1080 and substances containing 1080 require a more detailed explanation. These controls are:

- approved handler requirements (control codes T6, E7 and AH1)
- controlled substance licence requirements (Schedule 3 of the Hazardous Substance (Sodium Fluoroacetate) Transfer Notice 2005)
- tracking requirements (control code TR1)
- permissions (Schedule 3 of the Hazardous Substance (Sodium Fluoroacetate) Transfer Notice 2005).
- transitional controls (see section 6.2.1.3).

The Agency has included further explanation of these controls in Appendix L.

6.3 Non-HSNO Act controls

6.3.1 Agricultural Compounds and Veterinary Medicines Act 1997

The Agricultural Compounds and Veterinary Medicines Group (ACVM Group) of the New Zealand Food Safety Authority imposes controls (referred to as conditions) on the use of 1080 under the ACVM Act. The conditions applied by the ACVM Group to substances containing 1080 are detailed in Table 6.6.

Details of the specific trade name products and their applicable conditions are given in Table 6.7.

Table 6.6: Agricultural Compounds and Veterinary Medicines Group conditions for substances containing 1080

ACVM condition number	Description (summary)
2	The product must be manufactured in accordance with the ACVM Standard for Good Manufacturing Practice and to the chemistry and manufacturing specifications provided by the registrant and approved as part of the registration.
3	Plant Compound: In addition to any labelling, advertising or promotion requirements specified in the current registration, labelling, advertising or promotion of the product must comply with the current ACVM—New Zealand Labelling and Advertising Guide for Plant Compounds Requiring Registration.

ACVM condition number	Description (summary)
4	The product must only be sold or imported according to the current registration.
8	<p>If the product is used on any food producing plant or on or around any plant not used to produce food:</p> <p>other than those specified on the current registration; or</p> <p>in a manner not specified in the current registration,</p> <p>the user must ensure that residues of any substance in the product that may occur in plant material produced from the plants treated, or in animal material produced from grazing or direct feeding of the plants treated to food producing animals, do not exceed the lesser of either:</p> <p>the specified residue limit in the current New Zealand (Maximum Residue of Agricultural Compounds) Food Standard and any subsequent amendments;</p> <p>or</p> <p>the default maximum residue limit in the current New Zealand (Maximum Residue of Agricultural Compounds) Food Standard and any subsequent amendments, when a maximum residue limit for that substance has not been specified.</p>
11	Veterinary Medicine: In addition to any labelling, advertising or promotion requirements specified in the current registration, labelling, advertising or promotion of the product must comply with the current ACVM—New Zealand Labelling and Advertising Guide for Veterinary Medicines Requiring Registration.
27	This product must only be sold to and used by the individuals/organisations specified in the label content.
31	This product must only be used as specified in the label content.
37	Ongoing Obligations: The registrant must provide an annual summary of adverse events to the ACVM Group. Adverse events which have serious implications for the continued use of the product must be notified immediately. The registrant must also advise the ACVM Group of any new studies or data that contradict information previously supplied.
43	The product must be sold only by a person who has been approved by the ACVM Group.
44	<p>If the label indicates the product can only be sold to and/or used by a person holding a controlled substances licence then:</p> <p>this product must be sold only to a person holding a controlled substances licence issued by a test certifier who has been approved by the ACVM Group.</p>
45	<p>If the label indicates the product can only be sold to and/or used by a person holding a controlled substances licence then:</p> <p>any advertisement or promotion for this product must clearly state that it can only be sold to a person who holds a controlled substances licence.</p>
46	<p>If the label indicates the product can only be sold to and/or used by a person holding a controlled substances licence then:</p> <p>the product must not be displayed for the general public to see. It must be kept secure from unauthorised persons and individual containers marked for trace back purposes. A register of sales must be kept (minimum of three years), recording who the product was sold to (controlled substances licence reference) and the container(s) serial identity.</p>
47	<p>If the label indicates the product can only be sold to and/or used by a person holding a controlled substances licence then:</p> <p>the product must be used only by a person either holding a controlled substances licence issued by a test certifier who has been approved by the ACVM Group, or by a person under the direct supervision of a person holding a controlled substances licence.</p>
48	<p>If the product is to be aerially applied, then the public must be given sufficient notice prior to application informing them of:</p> <ol style="list-style-type: none"> what is being used; when it is to be used; where it is going to be used; the responsible person; and appropriate warnings in regard potential harm (dogs should be kept out of the area). <p>The application must not be earlier than the date of application stated in the public notification and, if the product has not been applied within two months, the notification is invalid.</p>

6.3 Non-HSNO Act controls

ACVM condition number	Description (summary)
49	<p>If the label indicates the product can only be sold to and/or used by a person holding a controlled substances licence then:</p> <p>Signs must be posted in prominent places around the perimeter of the treated area. The signs must remain in place until monitoring confirms that the product is no longer present. Signs must state:</p> <ul style="list-style-type: none"> a) that it is an offence for any person to remove the sign(s) prior to clearance of the area; b) that it is an offence for any person (other than the applicator) to remove/move baits from the area; c) Warning of potential harm to dogs.
50	<p>If the label indicates the product can only be sold to and/or used by a person holding a controlled substances licence then:</p> <p>security, identity and application of the product must be under the control of a specified person who also holds a controlled substances licence from a test certifier approved by the ACVM Group.</p>
51	<p>Vertebrate Toxic Agents: In addition to any labelling, advertising or promotion requirements specified in the current registration, labelling, advertising or promotion of the product must comply with the current ACVM—New Zealand Labelling and Advertising Guide for Vertebrate Toxic Agents Requiring Registration.</p>

Table 6.7: Trade name products (containing 1080) registered with the Agricultural Compounds and Veterinary Medicines Group and their conditions

Product name	Agricultural Compounds and Veterinary Medicines Group condition number																
	2	3	4	8	11	27	31	37	43	44	45	46	47	48	49	50	51
0.06% 1080 Pellets	x	-	x	-	-	-	x	x	x	x	x	x	x	x	x	x	x
1080 Solution	x	-	x	-	-	-	x	x	x	x	x	x	x	x	x	x	x
0.2% 1080 Pellets	x	-	x	-	-	-	x	x	x	x	x	x	x	x	x	x	x
10% 1080 Gel	x	-	x	-	-	-	x	x	x	x	x	x	x	-	x	x	x
0.08% 1080 Pellets	x	-	x	-	-	-	x	x	x	x	x	x	x	x	x	x	x
0.15% 1080 Pellets	x	-	x	-	-	-	x	x	x	x	x	x	x	x	x	x	x
5% 1080 gel	x	-	x	-	-	-	x	x	x	x	x	x	x	-	x	x	x
0.04% 1080 Pellets	x	-	x	-	-	-	x	x	x	x	x	x	x	x	x	x	x
0.10% 1080 Feral Cat Bait	x	-	x	-	-	x	x	x	x	x	x	x	x	-	x	x	x
Pestoff Professional 1080 Possum and Rabbit Paste 0.06%	x	-	x	-	-	-	x	x	x	x	x	x	x	-	x	x	x
Pestoff Professional 1080 Possum Paste 0.08%	x	-	x	-	-	-	x	x	x	x	x	x	x	-	x	x	x
Pestoff Professional 1080 Possum Paste 0.15%	x	-	x	-	-	-	x	x	x	x	x	x	x	-	x	x	x
No Possums 1080 Gel Bait	x	-	x	-	x	x	x	x	-	-	-	-	-	-	-	-	-
0.08% 1080 rodent Pellets	x	-	x	-	-	-	x	x	x	x	x	x	x	x	x	x	x
Pestoff Exterminator paste	x	-	x	-	-	-	x	x	x	x	x	x	x	-	x	x	x
1.0% 1080 wasp Paste	x	x	x	x	-	-	x	x	-	-	-	-	-	-	-	-	-

Note: x = condition applicable; - = condition not applicable.

6.3.2 Resource Management Act 1991: Resource consent requirements

6.3.2.1 Resource consent requirements: Background

Conditions may also be placed on the use of substances containing 1080 under the Resource Management Act 1991 (RMA), and may legally be stricter than controls under the HSNO Act, if that is appropriate for the purposes of the RMA.¹⁶ The Agency notes that the application of conditions on 1080 use under the RMA varies on a regional basis and depends on whether the activity of applying the 1080 formulation is considered to be a permitted, controlled or discretionary activity requiring resource consent. The Agency has considered the requirements of each regional council and the following unitary authorities that have the responsibilities of both local and regional councils: Gisborne, Tasman and Marlborough District Councils, Chatham Islands Council and Nelson City Council.

The Agency initially carried out a search for consent requirement details for each council to determine whether aerial and ground-based applications of substances containing 1080 are considered permitted, controlled or discretionary activities. Additionally, the Agency wanted to determine what standard conditions, if any, the permitted and controlled activities were subject to. When the Agency was unable to locate sufficient information to determine the requirements of a specific region, the Agency wrote to the relevant regional council requesting clarification of its requirements. The results of the Agency's research and correspondence with the councils and understanding of the regional requirements for 1080 operations are shown in Table L5, Appendix L. It is noted by the Agency that when the conditions placed on a permitted or controlled activity cannot be complied with, the activity (ie, the application of the 1080 baits) is then considered a discretionary activity for which no standard conditions are prescribed and resource consent must be obtained.

The information presented in Table L5, Appendix L, is the Agency's current understanding of the regional requirements for 1080 operations. The Agency notes that the regional requirements for applications of 1080 and other agrichemicals are complex due to regional variations and there being several applicable rules in each region.

6.3.2.2 Resource consent requirements: Conclusions

The Agency notes that regional requirements relating to the application of substances containing 1080 vary widely. From the regional information obtained, the Agency considers that the requirements range from the application of substances containing 1080 in all circumstances being a discretionary activity requiring resource consent (Environment Bay of Plenty) to both aerial and ground-based application of substances containing 1080 being permitted activities where the baits applied may

¹⁶ See section 142 of the HSNO Act.

directly and indirectly enter water (Environment Waikato, Auckland Regional Council and Horizons Regional Council). Given this variability, the Agency considers it difficult to identify any common patterns in the regional requirements. The Agency notes, however, that the topics listed below appear to be routinely addressed by conditions on permitted and controlled activities relating to the application of substances containing 1080. Note, however, that these do not apply across the board but appear to occur frequently.

Commonly occurring conditions on the application of substances containing 1080 as permitted or controlled activities address the following issues:

- prevention of direct discharge into a water body
- use of the substance in accordance with the manufacturer's instructions
- notification of adjacent landowners
- requirement for the substance to be applied to have an approval under the HSNO Act
- requirement for the regional council to be notified if accidental spillage of the substance occurs
- qualifications of the personnel involved in the application.

Commonly occurring matters that are addressed by regional councils for the application of substances containing 1080 as a controlled activity include:

- the concentration of bait and rate of application
- the form of the substance applied
- the method and timing of the substance's application
- information and monitoring requirements
- the duration of the consent.

