



Proposed Acceptability for Continuing Registration

PACR2004-27

Re-evaluation of brodifacoum, bromadiolone, chlorophacinone, diphacinone and warfarin

The purpose of this document is to inform the registrants, pesticide regulatory officials and the Canadian public that the Pest Management Regulatory Agency (PMRA) has completed a re-evaluation of brodifacoum, bromadiolone, chlorophacinone, diphacinone and warfarin. The PMRA has determined that brodifacoum, bromadiolone, chlorophacinone, diphacinone and warfarin are acceptable for continued registration provided that the proposed mitigation measures are adopted. Additional data requirements have been identified.

This Proposed Acceptability for Continuing Registration (PACR) document provides a rationale for the proposed regulatory decision for brodifacoum, bromadiolone, chlorophacinone, diphacinone and warfarin. The PMRA will accept written comments on this proposal up to 45 days from the date of publication of this document. Please forward all comments to the Publications Coordinator at the address below.

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1.0 Background

The PMRA is re-evaluating all pesticides, both active ingredients and formulated end-use products, that were registered prior to 31 December 1994 to ensure that their continued acceptability is examined using current scientific approaches. Regulatory Directive [DIR2001-03](#), *PMRA Re-evaluation Program*, presents the re-evaluation activities and program structure.

Brodifacoum, bromadiolone, chlorophacinone, diphacinone and warfarin have been re-evaluated by the PMRA under Re-evaluation Program 1 as described in [DIR2001-03](#). Under Program 1, the PMRA relies as much as possible on foreign reviews, typically United States Environmental Protection Agency (USEPA) Reregistration Eligibility Decision (RED) documents, to assess Canadian pest control products. For products to be re-evaluated under Program 1, there must exist a suitable USEPA review that meets the following conditions:

- it covers the main science areas, such as human health and the environment, that are necessary for Canadian regulatory decisions;
- it addresses the active ingredient and the main formulation types registered in Canada; and
- it is relevant to registered Canadian uses.

Based on the outcome of the USEPA review, the PMRA will propose, under Program 1, a regulatory decision and appropriate mitigation measures for Canadian uses of an active ingredient.

The USEPA conducted a re-evaluation of brodifacoum, bromadiolone, chlorophacinone, diphacinone and warfarin and concluded that, on the basis of health and environmental risk assessments, they were eligible for reregistration with implementation of mitigation measures. These conclusions were published in a 1991 Reregistration Eligibility Decision (RED)¹ document for warfarin, a 1998 RED² document for brodifacoum, bromadiolone, chlorophacinone and diphacinone, an amendment to the 1998 RED³ and a preliminary

¹ The USEPA Reregistration Eligibility Decision (RED) document for warfarin is available from the Chemical Status List on the Office of Pesticide Programs webpage at www.epa.gov/pesticides/reregistration

² The USEPA Reregistration Eligibility Decision (RED) document for the Rodenticide Cluster including brodifacoum, bromadiolone, chlorophacinone and diphacinone is available from the Chemical Status List on the Office of Pesticide Programs webpage at www.epa.gov/pesticides/reregistration

³ The USEPA Amendment to the Rodenticide Cluster and Zinc Phosphide Reregistration Eligibility Decision (RED) documents is available from the Federal Register Environmental Documents, under Pesticides, published on 28 November 2001, on the USEPA webpage at www.epa.gov/fedrgstr/

comparative ecological assessment⁴. The PMRA conclusions were based on the USEPA documents mentioned above, taking into account the Canadian use pattern and Canadian issues (e.g., the federal Toxic Substances Management Policy [TSMP]). A review of the chemistry of Canadian products was also conducted.

2.0 Re-evaluation of brodifacoum, bromadiolone, chlorophacinone, diphacinone and warfarin

Brodifacoum, bromadiolone, chlorophacinone, diphacinone and warfarin were first registered in Canada in 1979, 1978, 1973, 1955 and 1950 respectively. These rodenticides are all anticoagulants used in Canada primarily for the control of Norway rats, roof rats and house mice. Chlorophacinone and diphacinone are also used for the control of pocket gophers, ground squirrels and voles. The end-use products that are currently registered in Canada are listed in appendices I to V.

2.1 Chemical identification

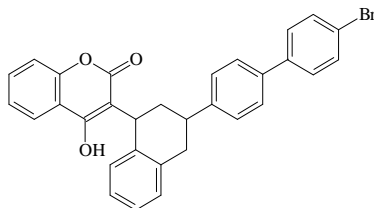
2.1.1 Brodifacoum

Active substance:	Brodifacoum
Function:	Rodenticide
Chemical names:	
IUPAC:	3-[3-(4'-bromobiphenyl-4-yl)-1,2,3,4-tetrahydro-1-naphthyl]-4-hydroxycoumarin
CAS:	3-[3-(4'-bromo-[1,1'-biphenyl]-4-yl)-1,2,3,4-tetrahydro-1-naphthalenyl]-4-hydroxy-2H-1-benzopyran-2-one
Chemical class:	Coumarin
CAS number:	56073-10-0
Molecular formula:	C ₃₁ H ₂₃ BrO ₃

⁴ The USEPA document *Potential Risks of Nine Rodenticides to Birds and Nontarget Mammals: A Comparative Approach* (December 2002) is available on the Office of Pesticide Programs webpage at www.epa.gov/pesticides/rodenticidecluster/

Molecular weight: 523.44

Structural formula:



2.1.2 Bromadiolone

Active substance: Bromadiolone

Function: Rodenticide

Chemical names:

IUPAC: 3-(((1*RS*,3*RS*;1*RS*,3*SR*)-3-(4'-bromobiphenyl-4-yl)-3-hydroxy-1-phenyl)propyl)-4-hydroxy-coumarin

CAS: 3-[3-(4'-bromo[1,1'-biphenyl]-4-yl)-3-hydroxy-1-phenylpropyl]-4-hydroxy-2H-1-benzopyran-2-one

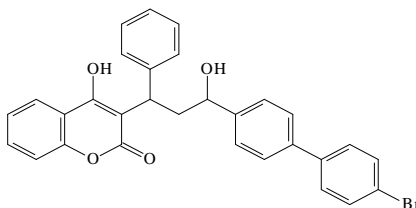
Chemical class: Coumarin

CAS number: 28772-56-7

Molecular formula: $C_{30}H_{23}BrO_4$

Molecular weight: 527.4

Structural formula:

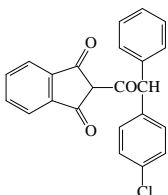


2.1.3 Chlorophacinone

Active substance: Chlorophacinone

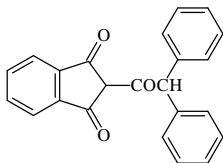
Function: Rodenticide

Chemical names:
IUPAC: 2-[2-(4-chlorophenyl)-2-phenylacetyl]indan-1,3-dione
CAS: 2-[(4-chlorophenyl)phenylacetyl]-1H-indene-1,3-(2H)-dione
Chemical class: Indandione
CAS number: 3691-35-8
Molecular formula: $C_{23}H_{15}ClO_3$
Molecular weight: 374.8
Structural formula:



2.1.4 Diphacinone

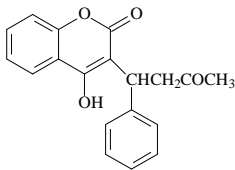
Active substance: Diphacinone
Function: Rodenticide
Chemical names:
IUPAC: 2-(diphenylacetyl)indan-1,3-dione
CAS: 2-(diphenylacetyl)-1H-indene-1,3(2H)-dione
Chemical class: Indandione
CAS number: 82-66-6
Molecular formula: $C_{23}H_{16}O_3$
Molecular weight: 340.04
Structural formula:



2.1.5 Warfarin

Active substance:	Warfarin
Function:	Rodenticide
Chemical names:	
IUPAC:	(<i>RS</i>)-4-hydroxy-3-(3-oxo-1-phenylbutyl)coumarin
CAS:	4-hydroxy-3-(3-oxo-1-phenylbutyl)-2 <i>H</i> -1-benzopyran-2-one
Chemical class:	Coumarin
CAS number:	81-81-2
Molecular formula:	C ₁₉ H ₁₆ O
Molecular weight:	308.3

Structural formula:



2.2 Description of uses

In Canada, warfarin, brodifacoum, bromadiolone, chlorophacinone and diphacinone are all registered for use in and around domestic dwellings as well as agricultural, commercial, industrial and public buildings, including food service establishments, processing plants, granary bins and storage areas. Brodifacoum is also registered for use inside transport/cargo vehicles; brodifacoum, chlorophacinone and diphacinone for use in sewers; and chlorophacinone and diphacinone for use in garbage dumps to control commensal rats and mice. In addition, chlorophacinone is also registered for use in rangelands as well as crop and non-crop areas for ground squirrel control and in orchards, nurseries and ornamentals for vole control. Diphacinone is also registered for the following uses:

- in farm yards, grain fields, nurseries, turf and vegetable gardens to control ground squirrels;
- orchards, shelter belts, Christmas tree plantations, newly reforested areas and nurseries to control mice (*Microtus sp.* and *Peromyscus sp.*); and
- rangeland, cropland, forest and non-crop areas, including parks, nurseries and around homes, to control pocket gophers in their burrows.

In Canada, the majority of domestic and commercial rodenticides are formulated as a solid bait (i.e., meal bait, pellets, ready-to-use place packs, paraffin blocks). Five domestic products are sold pre-packaged in bait stations and one domestic product is a liquid concentrate of diphacinone salt (0.106%) that is diluted in water to prepare a liquid 0.0025% bait. Similarly, some commercial products are sold as liquid or powder concentrates that must be mixed with suitable bait material to obtain a useable bait.

Bait for commensal rodents is placed by hand. Several diphacinone and chlorophacinone commercial products and one chlorophacinone domestic product are registered for use for vole, ground squirrel or pocket gopher control. For vole control, pellets are scattered by hand or by mechanical ground application in the fall (e.g., in orchards). For ground squirrel or pocket gopher control, the burrows are hand baited (i.e., bait is directly placed in hole) or bait stations are used above ground.

2.3 Effects having relevance to human health

Canadian registered use sites, application rates, application method and formulation type are also registered in the United States, and the USEPA assessments described in the RED document for brodifacoum, bromadiolone, chlorophacinone and diphacinone as well as in the RED document for warfarin are considered to be an adequate basis for the proposed Canadian re-evaluation decision with respect to human health.

Based on USEPA RED conclusions with regards to occupational exposure, the PMRA is requiring the following mitigation measures.

- Labels of warfarin commercial concentrate products are required to include a statement regarding the teratogenicity of warfarin and its potential to cause birth defects.
- In order to mitigate the risk to handlers of rodenticides, the PMRA is requiring that gloves be worn during handling of rodenticides for all domestic and commercial end-use products, with the exception of those products that are pre-packaged in a bait station. In addition to wearing gloves, all commercial handlers will be required to wear a long-sleeved shirt, long pants, and shoes plus socks.
- To mitigate the potential for both inhalation and dermal exposure, all commercial handlers using concentrate dust or powder formulations must wear a NIOSH approved dust/mist filtering respirator and protective eyewear during pouring and mixing of concentrate with bait, in addition to the basic requirements listed above. Although the USEPA established in the 1991 RED for warfarin that the use pattern of warfarin did not trigger data requirements for applicator exposure studies and no risk assessment was required, based on the fact that warfarin is a known teratogen at clinical doses, the above recommendations apply to commercial warfarin concentrate dusts as well.

- Commercial handlers loading pellets or baits into mechanical ground equipment and those loading/applying with hand-held or handpushed equipment will also be required to wear a NIOSH approved dust/mist filtering respirator and protective eyewear in addition to the basic requirements of gloves, long sleeved shirt and long pants, and shoes plus socks.

Based on USEPA RED conclusions with regards to postapplication exposure, the PMRA is requiring the following mitigation measures.

- All domestic and commercial end-use product labels must contain wording to place products in a tamper-resistant bait station or to place the product out of reach of children and pets. In addition, commercial end-use products will specify on the label what characteristics constitute a tamper-resistant bait station.
- To protect children and pets from possible exposure from the container before application, the PMRA is requiring registrants to provide a statement on all domestic and commercial end-use product labels to store the product in the original container in a secure location inaccessible to children, pets and livestock.
- Any registrant with labels that recommend intravenous administration of the Vitamin K₁ antidote will be requested to remove this recommendation from the label because this antidote can cause anaphylactic reactions.

Even though incorporation of a bittering agent would not make the bait less toxic, the PMRA considers that a bittering agent may deter accidental human consumption of the bait. In Canada, several currently registered brodifacoum, bromadiolone and diphacinone end-use products (including both domestic and commercial products) as well as bromethalin products (a recently registered rodenticide not under re-evaluation) already contain the bittering agent denatonium benzoate in their formulation. Although indicator dyes would not prevent poisoning incidents, they could indicate that ingestion of a rodenticide occurred. The PMRA supports voluntary incorporation of indicator dyes and bittering agents in rodenticide formulations. Registrants are advised that the PMRA will also be consulting in the near future with stakeholders to consider these and other options to further mitigate potential exposure to children.

2.4 Environmental assessment

This assessment is based mainly on data from the USEPA RED document for the Rodenticide Cluster, the RED for warfarin (May 1991) and the USEPA document entitled *Potential Risks of Nine Rodenticides to Birds and Nontarget Mammals: A Comparative Approach*.

In characterizing the environmental risk of five rodenticides—brodifacoum, bromadiolone, chlorophacinone, diphacinone and warfarin—the PMRA utilized a

deterministic approach that characterizes the risk by the quotient method, in which a risk quotient (RQ) is calculated as the ratio of the estimated environmental concentration (EEC) to the effects endpoint of concern. RQs less than one are considered to be a low risk to non-target organisms, whereas RQs greater than one indicate some degree of risk.

In the assessment, EECs for aquatic and terrestrial ecosystems were based on label rates and one application per season. Toxicity endpoints (acute and/or chronic) were chosen for the most sensitive species and used as surrogates for the range of species that can potentially be exposed following treatment with rodenticides.

2.4.1 Environmental fate

The solubility in water of these five chemicals varies from low to very soluble and, because of their low vapour pressure, they do not readily volatilize into the air. Henry's Law constants indicate low volatility from moist soil and water surfaces. The partition coefficients indicate that most of these chemicals have the potential for bioaccumulation.

Available data indicate that the five reviewed rodenticides are moderately persistent and immobile in soils. The only exception is bromadiolone, which may leach in soils low in organic matter and clay. Brodifacoum, bromadiolone, chlorophacinone and warfarin are stable to hydrolysis at pH 5, 7 and 9. Diphacinone is also hydrolytically stable at pH 7 and 9. Chlorophacinone quickly undergoes phototransformation in water.

2.4.2 Environmental toxicology

Laboratory studies demonstrated that the five rodenticides are acutely and chronically toxic to a wide variety of organisms, including birds, mammals, fish and aquatic invertebrates.

These rodenticides are moderately to highly toxic to freshwater invertebrates ($EC_{50} = 0.24\text{--}2.0$ mg a.i./L) and moderately to very highly toxic to freshwater fish ($LC_{50} = 0.015\text{--}7.5$ mg a.i./L). They are moderately to very highly toxic to birds ($LD_{50} = 0.26\text{--}620$ mg a.i./kg) on an acute basis and moderately to very highly toxic ($LC_{50} = 0.8\text{--}906$ mg a.i./kg) on a dietary basis. They are very highly toxic to mammals ($LD_{50} = 0.2\text{--}35.7$ mg a.i./kg) on an acute basis. In addition, they are a cause of secondary toxicity to predator/scavenger birds and mammals.

2.4.3 Terrestrial assessment

The results of this screening assessment identified various levels of risk to non-target terrestrial organisms exposed to the five rodenticides.

Birds

The potential for exposure of seed-eating birds to food baits exists primarily for field applications of unprotected loose bait (i.e., ground broadcast or hand applied pellets or treated grains). Minimal exposure is expected for applications where bait is placed in protected bait stations or areas inaccessible to non-target wildlife. Birds that are mainly herbivorous or insectivorous are not expected to be at risk from grain-based food baits.

The acute primary risk assessment for loose food baits was based on the number of LD₅₀s potentially consumed by a bird in one day. RQs were calculated for three separate weight classes of birds: 20–50 g (e.g., passerine), 100–200 g (e.g., upland gamebird) and 500–1000 g (e.g., waterfowl). The results (RQ = 0.1–0.4) indicate that birds are not at risk when risk is based on the number of LD₅₀s potentially consumed by granivorous birds in one day. However, chlorophacinone and diphacinone are multiple-feeding coagulants and risk to birds that feed on bait for several days is likely greater than predicted by RQ values based on a single feeding.

Assessment of chronic (dietary) risk from rodenticides based on the EEC in grain or pellets (50 mg a.i./kg diet for brodifacoum, bromadiolone, chlorophacinone and diphacinone, and 250 mg a.i./kg diet for warfarin) resulted in RQs for bobwhite quail of 0.1, 4, 9, 13 and 625 for diphacinone, warfarin, chlorophacinone, bromadiolone and brodifacoum, respectively, indicating low to very high risk.

Laboratory studies and incident reports indicated that rodenticides are posing a secondary risk to avian predators and scavengers that may feed on poisoned prey. RQs cannot be calculated for secondary risk because levels of toxin in prey are unknown. Consequently, qualitative assessments of potential secondary risk are made based on mortality and other adverse effects reported in secondary hazard tests. Based on the available data, the comparative analysis conducted by the USEPA indicated that brodifacoum poses the greatest potential secondary risk to birds (42% mortality), and bromadiolone, diphacinone and warfarin pose greater potential risks (9% mortality) than does chlorophacinone (0% mortality).

Mammals

Rodenticide baits are formulated to be lethal to small mammals and they are not selective of the target species. Therefore, baits pose a potential risk to any small mammal that eats treated pellets or grains. Primary risk to larger mammals is reduced for applications that require protected bait stations. However, larger mammals are potentially at risk if they eat baits used in broadcast application (chlorophacinone and diphacinone).

The amount of bait that non-target mammals of various sizes need to eat in a single feeding to obtain an LD₅₀ dose was estimated from the acute oral toxicity for the laboratory rat and mouse. A 25 g, 100 g and 1000 g mammal can potentially ingest an LD₅₀ dose by consuming 0.2 to 3, 0.8 to 5 and 8 to 46 g of bait, respectively.

All anticoagulants pose a potential secondary risk to mammalian predators and scavengers. The comparative analysis indicate that mean mortality (%) and retention time in blood (d) were the most significant measures of effect in secondary lab studies, leading to the conclusion that diphacinone (58% and 0.82 d), chlorophacinone (55% and 0.40 d) and brodifacoum (42% and 7.30 d) pose greater potential secondary risk than do bromadiolone (23% and 1.40 d) and warfarin (9% and 5.6 d).

2.4.4 Aquatic assessment

The five reviewed rodenticides are moderately to highly toxic to freshwater invertebrates and moderately to very highly toxic to freshwater fish. Therefore, there is a potential risk to aquatic organisms. However, the use pattern for rodenticides indicates that exposure to aquatic organisms will be minimal.

2.4.5 Toxic Substances Management Policy

During the review of the five anticoagulant rodenticides, the PMRA has considered the implications of the federal TSMP⁵ and PMRA Regulatory Directive [DIR99-03](#)⁶ and has concluded the following:

- None of the actives meet TSMP Track 1 criteria.
- Brodifacoum is bioaccumulative. The octanol-water partition coefficient, log K_{ow}, of 8.5 is above the TSMP Track 1 cut-off criterion of ≥5.0. The values for half-life in air (no data, not volatile), water (no biotransformation data; stable to hydrolysis at pH 5, 7 and 9) and soil (157 d) are below the TSMP Track 1 cut-off criteria for air (≥ 2 d), soil (≥ 182 d) and water (≥ 182 d).
- The other chemicals are not bioaccumulative. The octanol-water partition coefficients, log K_{ow}, range from 2.37 to 4.27, which is below the TSMP Track 1 cut-off criterion of ≥5.0. The values for half-life in air (no data, not volatile), water (no biotransformation data; however, they are stable to hydrolysis at pH 5,

⁵ The federal Toxic Substances Management Policy is available through Environment Canada's website at www.ec.gc.ca/toxics

⁶ Regulatory Directive [DIR99-03](#), *The Pest Management Regulatory Agency's Strategy for Implementing the Toxic Substances Management Policy*, is available through the Pest Management Information Service. Phone: 1 800 267-6315 within Canada or (613) 736-3799 outside Canada (long distance charges apply); Fax: (613) 736-3798; E-mail: pmra_infoserv@hc-sc.gc.ca; or through our website at www.hc-sc.gc.ca/pmra-arla/

7 and 9) and soil (14 to 45 d) are below the TSMP Track 1 cut-off criteria for air (≥ 2 d), soil (≥ 182 d) and water (≥ 182 d).

- None of the identified major transformation products meets TSMP Track 1 criteria.

2.4.6 Environmental assessment conclusions

The reviewed rodenticides are moderately to very highly toxic to birds and mammals. They also pose a secondary risk to avian and mammalian predators and scavengers that may feed on poisoned prey. Brodifacoum, in particular, poses the highest risk to non-target birds and mammals.

The reviewed rodenticides are moderately to highly toxic to freshwater invertebrates and moderately to very highly toxic to freshwater fish. However, the use pattern for these rodenticides indicates that exposure of aquatic organisms to rodenticides will be minimal.

2.4.7 Environmental risk mitigation

Mitigation of potential impacts on terrestrial ecosystems is difficult given that the non-target organisms frequent treated areas. For birds and mammals, there are no available options that would effectively reduce the risk that results from ingestion of bait or food sources in treated areas. Restriction of brodifacoum to indoor use only may decrease the risk.

3.0 Proposed re-evaluation decision

A 1991 RED document for warfarin, a 1998 RED document for brodifacoum, bromadiolone, chlorophacinone and diphacinone, an amendment to the 1998 RED as well as a preliminary comparative ecological assessment, addressing the main science areas that are necessary for Canadian regulatory decisions, i.e., human health and the environment, were published by the USEPA. These documents addressed uses of brodifacoum, bromadiolone, chlorophacinone, diphacinone and its sodium salt, and warfarin relevant to Canada. Based on the USEPA documents, PMRA has determined that brodifacoum, bromadiolone, chlorophacinone, diphacinone and its sodium salt, and warfarin are acceptable for continued registration provided that the mitigation measures specified below are implemented. Additional data requirements have been identified in Section 5.0.

It should be noted that for EPs that contain more than one active ingredient under re-evaluation, registration status might change as a result of the re-evaluation of the remaining affected active ingredients.

The PMRA will accept written comments on this proposal up to 45 days from the date of publication of this document to allow interested parties an opportunity to provide input into the proposed re-evaluation decision for these products.

4.0 Proposed regulatory action

4.1 Proposed Canadian regulatory action relating to human health

For Canadian labelling requirements with respect to human health, please refer to Appendix VI with regards to domestic end-use products and Appendix VII with regards to commercial end-use products containing warfarin, brodifacoum, bromadiolone, chlorophacinone, diphacinone and its sodium salt. A submission to request these label revisions is required within 90 days of finalization of the re-evaluation decision.

Registrants are advised that the PMRA will also be consulting in the near future with stakeholders to consider the addition of a bittering agent, an indicator dye and other options to further mitigate potential exposure to children.

4.2 Proposed Canadian regulatory action relating to environment

- Use of brodifacoum should be restricted to indoor use only. Labels for brodifacoum end-use products must be amended to include the following statement:

“For indoor use only.”

- For bromadiolone, chlorophacinone, diphacinone and warfarin, to protect non-target wildlife, all domestic and commercial end-use product labels that currently allow placement of rat and mouse baits “in and around buildings” must be amended to read as follows:

“indoors and against the outside walls of buildings.”

A submission to request these label revisions is required within 90 days of finalization of the re-evaluation decision.

5.0 Additional data requirements

Registrants of the technical grade active ingredients of brodifacoum, bromadiolone, chlorophacinone, diphacinone and its sodium salt, and warfarin are required to submit the following within 24 months of finalization of the re-evaluation decision:

- All data (as they relate to Canadian use patterns) submitted to the USEPA in response to the American data call-in prior to reregistration in the United States and USEPA Data Evaluation Reports (DERs);

- All data (as they relate to Canadian use patterns) that were required by the USEPA as a condition of reregistration of brodifacoum, bromadiolone, chlorophacinone, diphacinone and its sodium salt, and warfarin; and
- A commitment and schedule to address Canadian requirements that are not addressed through submission of the data outlined above. These are outlined in the PMRA's data code (DACO)⁷ tables for use-site categories 3 (Empty Food Storage Areas), 12 (Stored Food and Feed), 20 (Structural) and 32 (Various Outdoor Sites) for brodifacoum, bromadiolone, chlorophacinone, diphacinone and its sodium salt, and warfarin.

The above data and additional data may be required sooner if expansion of the current uses of brodifacoum, bromadiolone, chlorophacinone, diphacinone or its sodium salt, or warfarin is requested.

⁷ Use-site category DACO tables can be located at the PMRA website at www.hc-sc.gc.ca/pmra-arla

List of abbreviations

a.i.	active ingredient
CAS	Chemical Abstracts Service
d	day(s)
DACO	data code
DER	Data Evaluation Report
EC ₅₀	effect concentration 50%
EEC	estimated environmental concentration
IUPAC	International Union of Pure and Applied Chemistry
kg	kilogram
L	litre
LC ₅₀	lethal concentration 50%
LD ₅₀	lethal dose 50%
mg	milligram
NIOSH	National Institute of Occupational Safety and Health
PACR	Proposed Acceptability for Continuing Registration
PMRA	Pest Management Regulatory Agency
PPE	personal protective equipment
RED	Reregistration Eligibility Decision
RQ	risk quotient
TSMP	Toxic Substances Management Policy
USEPA	United States Environmental Protection Agency

Appendix I Canadian brodifacoum products currently registered as of 31 December 2003

Product name	Class	Guarantee	Registrant	Registration number
Jaguar Rodenticide Pellet Place Pacs	D	0.0025 %	Motomco Ltd.	26129
Jaguar All-Weather Blox Rodenticide	D	0.0025 %	Motomco Ltd.	26130
Talon Rodenticide Pellets For Mice & Rats	C	0.005 %	Syngenta Crop Protection Canada Inc.	15927
Ratak + Rodenticide Pellets	C	0.005 %	Syngenta Crop Protection Canada Inc.	16064
Ratak + RodenticideMini- Pellets For Mice & Rats	C	0.005 %	Syngenta Crop Protection Canada Inc.	17354
Weather Blok XT Bait Ratak + Rodenticide	C	0.005 %	Syngenta Crop Protection Canada Inc.	21084
Weather Blok XT Bait Talon Rodenticide (Master product)	C	0.005 %	Syngenta Crop Protection Canada Inc.	21085
Final All-Weather Blox	C	0.005 %	Bell Laboratories Inc.	25423
Final Rodenticide Commercial	C	0.005 %	Bell Laboratories Inc.	25424
Final Rodenticide Place Pacs	C	0.005 %	Bell Laboratories Inc.	25773
Jaguar 50 Bait Chunx	C	0.005 %	Motomco Ltd.	26593
Jaguar 50 Rodenticide	C	0.005 %	Motomco Ltd.	26594
Jaguar 50 Bait Chunx (Master product)	C	0.005 %	Motomco Ltd.	26673
Jaguar 50 Bait Chunx Commercial	C	0.005 %	Motomco Ltd.	26829
Jaguar 50 Rodenticide Place Pacs	C	0.005 %	Motomco Ltd.	26859
Brodifacoum Technical Rodenticide	T	91 %	Syngenta Crop Protection Canada Inc.	22679
Technical Brodifacoum	T	98 %	Bell Laboratories Inc.	25422

D = Domestic; C = Commercial; T = Technical

Appendix II Canadian bromadiolone products currently registered as of 31 December 2003

Product name	Class	Guarantee	Registrant	Registration number
Wilson Tomcat Ultra Block Bait	D	0.005%	Motomco Ltd.	27189
Tomcat Ultra Prebaited Mouse Bait Station	D	0.005%	Motomco Ltd.	27190
Tomcat Ultra	D	0.005%	Motomco Ltd.	27191
Wilson Tomcat Ultra Pelleted Bait	D	0.005%	Motomco Ltd.	27202
Rodentex Rodenticide Pellets	D	0.005%	King Home & Garden Inc.	21185
Rodentex Rodenticide Paraffin Block	D	0.005%	King Home & Garden Inc.	21186
Rodentex Mini-Block Mini-Pack	D	0.005%	King Home & Garden Inc.	26915
Ruse II Rodenticide Pellets Place Packs	D	0.005%	Vétoquinol N.-A. Inc.	25772
Boothill Rodenticide Place Pack Pellets	D	0.005%	Liphatech Inc.	20761
Boothill Rodenticide Paraffin Block II	D	0.005%	Liphatech Inc.	21176
Boothill Rodenticide Pellets II	D	0.005%	Liphatech Inc.	21177
Maki Mini Block	D	0.005%	Liphatech Inc.	22050
Boot Hill Rodenticide Mini Block	D	0.005%	Liphatech Inc.	23399
Boothill Rodenticide Paraffin Block with Bitrex	D	0.005%	Liphatech Inc.	24014
Boot Hill Rodenticide Pellets Place Packs with Bitrex	D	0.005%	Liphatech Inc.	24016
Boot Hill Mini-Block with Bitrex	D	0.005%	Liphatech Inc.	24019
Boot Hill Meal Bait Place Packs	D	0.005%	Liphatech Inc.	25690
Wilson Super Rat & Mouse Killer with Bromadiolone	D	0.005%	Nu-Gro IP Inc.	15958
Wilson Bromone Rodenticide Pellets	D	0.005%	Nu-Gro IP Inc.	16699
Co-op Bromone Rat & Mouse Killer Rodenticide Pellets	D	0.005%	Interprovincial Cooperative Limited	16699.02
Wilson Bromone Rodenticide Meal Bait	D	0.005%	Nu-Gro IP Inc.	16700

Product name	Class	Guarantee	Registrant	Registration number
Co-op Bromone Rat & Mouse Killer Rodenticide Meal Bait	D	0.005%	Interprovincial Cooperative Limited	16700.02
Wilson Super Mouse Treat	D	0.005%	Nu-Gro IP Inc.	16741
Co-op Bromone Rat & Mouse Canary Seed Mouse Bait	D	0.005%	Interprovincial Cooperative Limited	17049
Rat-X-Dura Block Rodenticide	D	0.005%	Nu-Gro IP Inc.	18020
Wilson Ratoxin Rat & Mouse Bait	D	0.005%	Nu-Gro IP Inc.	18237
Ratoxin Baitpacks with Bromadiolone	D	0.005%	Nu-Gro IP Inc.	18749
Wilson Wilsarin Rat & Mouse Bait Pellets with Bromadiolone	D	0.005%	Nu-Gro IP Inc.	18992
C-I-L Bromone Rat & Mouse Pellets	D	0.005%	Nu-Gro IP Inc.	24257
C-I-L Bromone Rate & Mouse Blocks	D	0.005%	Nu-Gro IP Inc.	24258
Conrac Rat & Mouse Bait Domestic	D	0.005%	Bell Laboratories Inc.	22237
Conrac Blox Kills Rats & Mice	D	0.005%	Bell Laboratories Inc.	22238
Conrac Rodenticide	D	0.005%	Bell Laboratories Inc.	22240
Conrac Mouse Bait Station	D	0.005%	Bell Laboratories Inc.	22241
Conrac All-Weather Cake	D	0.005%	Bell Laboratories Inc.	23646
Later's Rat & Mouse Bait	D	0.005%	Later Chemicals Ltd.	23302
Later's Rat & Mouse Pellets	D	0.005%	Later Chemicals Ltd.	23303
Single Feeding Rodenticide	D	0.005%	Maheu & Maheu Inc.	23297
Just One Bite Rat & Mouse Bait Bar	D	0.005%	Farnam Companies	22160
Just One Bite Rat & Mouse Bait	D	0.005%	Farnam Companies	22161
Just One Bite Rat & Mouse Bait Nibblers Mini Bait Blocks	D	0.005%	Farnam Companies	23248
Just One Bite Rat & Mouse One-Timer	D	0.005%	Farnam Companies	27338
Snare Rodenticide Bait Pellet	D	0.005%	Citaldel Animal Health	23167
Snare Rodenticide Bait Blox	D	0.005%	Citaldel Animal Health	23168
Hawk Rodenticide	D	0.005%	Motomco Ltd.	22350
Hawk Bait Chunx Domestic	D	0.005%	Motomco Ltd.	22351
Hawk Mouse Bait Station	D	0.005%	Motomco Ltd.	22405

Product name	Class	Guarantee	Registrant	Registration number
Hawk Rodent Block	D	0.005%	Motomco Ltd.	22812
Maki Rodenticide Liquid Concentrate	C&MC	0.005%	Liphatech Inc.	15257
Maki Bulk Rodenticide Meal Bait	C	0.005%	Liphatech Inc.	15286
Wilson Rat-XB Meal Bait with Bromadiolone	C	0.005%	Nu-Gro IP Inc.	15676
Sanex Bromone Meal Bait	C	0.005%	Sanex Agro Inc.	15678 ¹
Wilson Bromone Rodenticide Pellet Baitpaks	C	0.005%	Nu-Gro IP Inc.	15788 ²
Rat-XB Baitpaks with Bromadiolone	C	0.005%	Nu-Gro IP Inc.	15795
Wilson Rat-XB Pellets with Bromadiolone	C	0.005%	Nu-Gro IP Inc.	19282
Maki Rodenticide Paraffin Block	C	0.005%	Liphatech Inc.	20240
Maki Liquid Rodent Bait	C	0.011%	Liphatech Inc.	20254 ³
Boothill Rodenticide Meal Bait Place Packs	C	0.005%	Liphatech Inc.	20256
Boothill Rodenticide Pellets Place Packs	C	0.005%	Liphatech Inc.	20257
Maki Bulk Rodenticide Pellets	C	0.005%	Liphatech Inc.	20258
Maki Place Pack Rodenticide Meal Bait	C	0.005%	Liphatech Inc.	20259
Maki Rodenticide Pellets Place Packs	C	0.005%	Liphatech Inc.	20401
Boothill Rodenticide Bulk Pellets	C	0.005%	Liphatech Inc.	21891
Conrac Rodenticide	C	0.005%	Bell Laboratories Inc.	22235
Conrac Rat and Mouse Bait	C	0.005%	Bell Laboratories Inc.	22236
Conrac Blox	C	0.005%	Bell Laboratories Inc.	22239
Wilson Bromone Rodenticide Pellets	C	0.005%	Nu-Gro IP Inc.	22592
Wilson Bromone Rodenticide Meal Bait	C	0.005%	Nu-Gro IP Inc.	22593
Maki Rodenticide Mini-Block	C	0.005%	Liphatech Inc.	22823
Boothill Rodenticide Mini-Blocks	C	0.005%	Liphatech Inc.	22824
Bromone Mouse Treat	C	0.005%	Nu-Gro IP Inc.	22912
Snare Rodenticide Bait Blox	C	0.005%	Citadel Animal Health	22975
Ratoxin Baitblox	C	0.005%	Kemsan Inc.	23252 ⁴
Ratoxin Bromadiolone Rodenticide Baitpaks	C	0.005%	Nu-Gro IP Inc.	23253

Product name	Class	Guarantee	Registrant	Registration number
Confrac All-Weather Cake	C	0.005%	Bell Laboratories Inc.	23662
Ruse Rodenticide Mini-Blocks	C	0.005%	Vétoquinol N.-A. Inc.	23729
Ruse Rodenticide Pellets Place Packs	C	0.005%	Vétoquinol N.-A. Inc.	23751
Confrac Super Size Blox	C	0.005%	Bell Laboratories Inc.	23870
Ratoxin Bromadiolone Rodenticide Bait Pellets	C	0.005%	Nu-Gro IP Inc.	23980
Ratoxin Bromadiolone Rodenticide Meal Bait	C	0.005%	Nu-Gro IP Inc.	23982
Maki Bulk Rodenticide Pellets with Bitrex	C	0.005%	Liphatech Inc.	24015
Maki Rodenticide Pellets Place Packs with Bitrex	C	0.005%	Liphatech Inc.	24017
Maki Rodenticide Paraffin Block with Bitrex	C	0.005%	Liphatech Inc.	24018
Maki Mini-Block with Bitrex	C	0.005%	Liphatech Inc.	24020
Wilson Bromone Bait-Bites	C	0.005%	Nu-Gro IP Inc.	24256
Mantek Big Gun Bromadiolone Pellets	C	0.005%	Mantek	24354
Chemsearch Rat Tat Tat II Bromadiolone Pellets	C	0.005%	National Chemsearch	24356
Certified Verm-Check Bromadiolone Pellets Rodenticide	C	0.005%	Certified Lab Products.	24402
Just One Bite Rodenticide Pellets	C	0.005%	Farnam Companies	26549
Just One Bite Nibblers Mini Blocks	C	0.005%	Farnam Companies	26550
Hawk Rodenticide	C	0.005%	Motomco Ltd.	26590
Hawk Bait Chunx	C	0.005%	Motomco Ltd.	26595
Just One Bite 75 Bait Packs	C	0.005%	Farnam Companies	26670
Rat-X-cubes Rodenticide	C	0.005%	Nu-Gro IP Inc.	26710
Hawk Rodenticide	C	0.005%	Motomco Ltd.	26716
Ratoxin Rodenticide Cubes	C	0.005%	Nu-Gro IP Inc.	27101
Ruse Rodenticide Paraffin Bars	C	0.005%	Vétoquinol N.-A. Inc.	27433
Maki Bromadiolone Technical Rodenticide	T	98.5%	Liphatech Inc.	19145
Maki Rodenticide 1.0% Dry Concentrate	MC	1.0%	Liphatech Inc.	20795
Confrac Concentrate Rodenticide	MC	1.0%	Bell Laboratories Inc.	22232

Product name	Class	Guarantee	Registrant	Registration number
Bromadiolone Technical	T	96.5%	Bell Laboratories Inc.	22233
Conrac Liquid Concentrate Rodenticide	MC	0.25%	Bell Laboratories Inc.	22390

D = Domestic; C = Commercial; MC = Manufacturing Concentrate; T = Technical

¹ Product 15678 was discontinued on 31 December 2002 and will expire on 31 December 2005. This product was not included in this review.

² Product 15788 was discontinued on 30 September 2003 and will expire on 3 September 2006. This product was not included in this review.

³ Product 20254 will be discontinued on 31 December 2004 and will expire on 31 December 2007.

⁴ Product 23252 was discontinued on 16 October 2001 and will expire on 31 December 2004. This product was not included in this review.

Appendix III Canadian chlorophacinone products currently registered as of 31 December 2003

Product name	Class	Guarantee	Registrant	Registration number
Rozol Rat & Mouse Killer Place Packs	D	0.005%	Liphatech Inc.	12018
Wilson's Mouse Treat Ready-to-Use Impregnated Canary Seed	D	0.005%	Nu-Gro IP Inc.	14058
Wilson Riddex Rat & Mouse Killer Bait Pellets	D	0.005%	Nu-Gro IP Inc.	15284
Wilson Riddex Rat & Mouse Killer Meal	D	0.005%	Nu-Gro IP Inc.	15431
Super Block Rodent Bait	D	0.005%	Produits Chimiques Superieur	17494
Ratol Superbags I Rodenticide	D	0.005%	Produits Chimiques Superieur	17495
Wilson Rozol Para-Block Rat and Mouse Bait	D	0.005%	Nu-Gro IP Inc.	18009
Wilson Bait Blocks	D	0.005%	Wilson Laboratories Inc.	18993 ¹
Ratol Suprafine Rodenticide (Paraffinized Pellets)	D	0.005%	Produits Chimiques Superieur	19280
Ground Force Rat & Mouse Killer	D	0.005%	Liphatech Inc.	20253
Superieur Mouse Eliminator	D	0.005%	Produits Chimiques Superieur	24193
J.T. Eaton Formula 90 Place Packs Ready-to-Use	D	0.005%	Eaton, J.T. & Co. Ltd.	25214
Ratol Paraffinized Pellets	D	0.005%	Produits Chimiques Superieur	26459
Rozol Rat & Mouse Killer	C	0.005%	Liphatech Inc.	11824
Wilson Rozol Ready-to-Use Rodent Bait	C	0.005%	Nu-Gro IP Inc.	11945
Sanex Rozol Bait Bites Rodenticide	C	0.005%	Nu-Gro IP Inc.	12406
Rozol Paraffinized Pellets	C	0.005%	Liphatech Inc.	13729
Wilson Rozol Paraffinized Pellets	C	0.005%	Nu-Gro IP Inc.	14909
Rat-XC Baitpaks With Chlorophacinone	C	0.005%	Nu-Gro IP Inc.	15823
Wilson Rat-XC Meal Bait With Chlorophacinone	C	0.005%	Nu-Gro IP Inc.	15824
Super Bloc II Rodent Bait	C	0.005%	Produits Chimiques Superieur	17048

Product name	Class	Guarantee	Registrant	Registration number
Ground Force Paraffinized Pellets Rodenticide	C	0.005%	Liphatech Inc.	20239
Wilson Liquid Rozol Rodenticide Concentrated Formula	C	0.07%	Nu-Gro IP Inc.	21160
Ratol Paraffinized Pellets	C	0.005%	Produits Chimiques Superieur	21810
Rozol Rodenticide Paraffin Block	C	0.005%	Liphatech Inc.	22164 ²
Poulin's Gopher Doom (Ready-to-Use Bait)	C	0.005%	Poulin Exterminators	22608
Ratachlor Ready-to-Use Rodenticide	C	0.005%	Ditchling Corp. Ltd.	24997
J.T. Eaton AC Formula 90 Ready-to-Use Rodenticide Place Packs	C	0.005%	Eaton, J.T. & Co. Ltd.	25652
Poulin's Rodent Doom (Ready-to-Use Bait)	C	0.005%	Poulin Exterminators	26847
Rodent Cake Plus Rodenticide	C	0.005%	Vetoquinol N.-A. Inc.	27228
Rodent Cake Pro Rodenticide	C	0.005%	Vetoquinol N.-A. Inc.	27229
Rozol Mineral Oil Concentrate Rodenticide	C and MC	0.28%	Liphatech Inc.	11342
Rozol 0.1% Dry Concentrate Rodenticide	C and MC	0.10%	Liphatech Inc.	11343
Rozol 2% Dry Concentrate Rodenticide	MC	2.0%	Liphatech Inc.	11700
Rozol Rodenticide Technical Powder	T	96.03%	Liphatech Inc.	19176

D = Domestic; C = Commercial; MC = Manufacturing Concentrate; T = Technical

¹ Product 18993 will be discontinued on 31 December 2004 and will expire on 31 December 2007.

² Product 22164 will be discontinued on 31 December 2004 and will expire on 31 December 2007.

Appendix IV

Canadian diphacinone products currently registered
as of 31 December 2003

Product name	Class	Guarantee	Registrant	Registration number
Ditrac All-Weather Cake	D	0.005%	Bell Laboratories Inc.	12017
Ramik Green	D	0.005%	Hacco Inc.	13359
Ratoxin Bait Block Rodenticide	D	0.005%	Nu-Gro IP Inc.	16865
Trap-N-A-Sak II	D	0.005%	Vétoquinol N.-A. Inc.	22069 ¹
Ditrac All-Weather Blox	D	0.005%	Bell Laboratories Inc.	22135
Ditrac Rat & Mouse Bait	D	0.005%	Bell Laboratories Inc.	22501
Tomcat All-Weather Bait Chunx	D	0.005%	Motomco Ltd.	22511
Tomcat Rodent Block	D	0.005%	Motomco Ltd.	22813
Ramik Bars	D	0.005%	Hacco Inc.	22851
Ditchling Bait Blocks Rodenticide Domestic	D	0.0052%	Ditchling Corp. Ltd.	23036
Maheu & Maheu Rodent Cake	D	0,005%	Maheu & Maheu Inc.	23089
Assassin Rat & Mouse Bait Pellets	D	0.005%	Citadel Animal Health	23165 ²
Rodent Cake II Rodenticide	D	0.005%	Vétoquinol N.-A. Inc.	23187 ³
Ditrac Rodenticide	D	0.005%	Bell Laboratories Inc.	23647
Assassin All-Weather Bait Bait Blox	D	0.005%	Citadel Animal Health	23670 ⁴
Liqua-Tox II Rodenticide	D	0.106%	Bell Laboratories Inc.	23720
Ramik Mouse Maze Rodenticide	D	0.005%	Hacco Inc.	23739
Ramik Mini Bars All-Weather Rat & Mouse Killer	D	0.005%	Hacco Inc.	27239
Wilson Riddex Bloks Rat and Mouse Bait	D	0.005%	Nu-Gro IP Inc.	27492
Gardex Rodent Bait Blocks	C	0.005%	Gardex Chemicals Ltd.	10079
Diphacin 110 Concentrate Rodenticide Powder	C	0.1%	Hacco Inc.	11093
Diphacin 120 Universal Concentrate Rodenticide Powder	C	0.106%	Hacco Inc.	11592
Ramik Green Rodenticide	C	0.005%	Hacco Inc.	11669

Product name	Class	Guarantee	Registrant	Registration number
Ramik Brown Rodenticide	C	0.005%	Hacco Inc.	11670
Gardex Sewer-Rat Bait Blocks Rodenticide	C	0.005%	Gardex Chemicals Ltd.	16776
Baker's All Weather Bait Blocks Rodenticide	C	0.005%	Eaton, J.T. & Co. Ltd.	17597
Baker's All Weather Bait Blocks	C	0.005%	Eaton, J.T. & Co. Ltd.	17598
Trap-N-A-Sak	C	0.005%	Vétoquinol N.-A. Inc.	21436 ⁵
Diphacinone Rodenticide Concentrate	C	0.1%	Bell Laboratories Inc.	19845
J.T. Eaton's Answer for the Control of Pocket Gophers	C	0.005%	Eaton, J.T. & Co. Ltd.	21877
Ditrac All-Weather Blox	C	0.005%	Bell Laboratories Inc.	22134
Tomcat All-Weather Bait Chunx	C	0.005%	Motomco Ltd.	22462
Ditrac Rat & Mouse Bait	C	0.005%	Bell Laboratories Inc.	22500
Dispar Rodent Cake	C	0.005%	Vétoquinol N.-A. Inc.	22760
Ditrac All-Weather Cake	C	0.005%	Bell Laboratories Inc.	22814
Ditchling Bait Blocks Rodenticide	C	0.0052%	Ditchling Corp. Ltd.	23037
Maheu & Maheu Inc. Super Rodent Cake	C	0.005%	Maheu & Maheu Inc.	23103
Assassin All-Weather Bait Blox	C	0.005%	Citadel Animal Health	23169 ⁶
Ditrac Super Size Blox	C	0.005%	Bell Laboratories Inc.	23558
Maheu & Maheu Sewer Rodenticide	C	0.005%	Maheu & Maheu Inc.	23606
Ditrac Rodenticide	C	0.005%	Bell Laboratories Inc.	23645
Ramik Blocks Rodenticide	C	0.005%	Hacco Inc.	26235
Tomcat All-Weather Rodent Block	C	0.005%	Motomco Ltd.	26598
Tomcat Rat & Mouse Bait	C	0.005%	Motomco Ltd.	26682
Tomcat Rat & Mouse Bait	C	0.005%	Motomco Ltd.	26894
1% Diphacinone Concentrate	MC	1.0%	Bell Laboratories Inc.	23559
Technical Water Soluble Diphacinone	T	100.0%	Bell Laboratories Inc.	19844

Product name	Class	Guarantee	Registrant	Registration number
Technical Diphacinone	T	100.0%	Bell Laboratories Inc.	19847
Diphacinone Technical Grade	T	98.6%	Hacco Inc.	25768

D = Domestic; C = Commercial; MC = Manufacturing Concentrate; T = Technical

¹ Product 22069 was discontinued on 30 September 2002 and will expire 30 September 2005. This product was not included in this review.

² Product 23165 was discontinued on 30 September 2002 and will expire on 31 December 2005. This product was not included in this review.

³ Product 23187 was discontinued on 18 November 2003 and will expire on 18 September 2006. This product was not included in this review.

⁴ Product 23670 was discontinued on 30 September 2002 and will expire on 31 December 2005. This product was not included in this review.

⁵ Product 21436 was discontinued on 30 April 2003 and will expire on December 31 2006. This product was not included in this review.

⁶ Product 23169 was discontinued on 31 December 2002 and will expire on 31 December 2005. This product was not included in this review.

Appendix V Canadian warfarin products currently registered as of 31 December 2003

Product name	Class	Guarantee	Registrant	Registration number
Wilson Warfarin Rat & Mouse Killer Pellets	D	0.025%	Nu-Gro IP Inc.	6944
Wilson Warfarin Rat & Mouse Killer Meal	D	0.025%	Nu-Gro IP Inc.	7222
Recochem Rat & Mouse Bait	D	0.025%	Recochem Inc.	7762
C-I-L Warfarin Rat & Mouse Bait	D	0.025%	Nu-Gro IP Inc.	9222
Co-op Warfarin Rat Killer Rodenticide Pellets	D	0.025% (s), 0.025% (w)	Interprovincial Cooperative Limited	11164
Co-op Warfarin Rat Killer Rodenticide Meal	D	0.025%	Interprovincial Cooperative Limited	11609
Co-op Rat Killer Meal Special Bait	D	0.025%	Interprovincial Cooperative Limited	11610 ¹
Home Brand Warfarin Rat and Mouse Killer	D	0.025%	Home Hardware Stores Ltd.	12327
Sorex Super Mouse Bait	D	0.1% (e), 0.025% (w)	Solaris Group A Unit of Monsanto Canada Inc.	15694 ²
Home Brand Warfarin Rat and Mouse Killer	D	0.025%	Home Hardware Stores Ltd.	15739
Swat Mouse & Rat Bait	D	0.025%	Swat Team Pest Services Inc.	15863 ³
Later's Warfarin Bait	D	0.025%	Later Chemicals Ltd.	23554
Wilson's Prolin Concentrate	C	0.5% (s), 0.5% (w)	Wilson Laboratories Inc.	8699
Poulin's Rat & Mouse Poison	C	0.025% (s), 0.025% (w)	Poulin Exterminators	8718
Wilson Warfarin 0.5% Concentrate Powder Rodenticide	C	0.5%	Nu-Gro IP Inc.	12247
S.A.R.M. Rat & Mouse Bait	C	0.025%	Sask. Assoc. Of Rural Mun.	14640
G & L Distributors Rat & Mouse Bait	C	0.025%	G & L Distributors Ltd.	14642
Wilson 1% Warfarin Concentrate	C	1%	Nu-Gro IP Inc.	19941
Technical Warfarin	T	100%	Bell Laboratories Inc.	19807
Warfarin Technical 100%	T	100%	Aldert Chemicals Ltd.	23041

Product name	Class	Guarantee	Registrant	Registration number
5% Warfarin Concentrate	MC	5%	Bell Laboratories Inc.	23560

s = sulfaquinoxaline sodium salt; w = warfarin; e = ergocalciferol

D = Domestic; C = Commercial; MC = Manufacturing Concentrate; T = Technical

¹ Product 11610 was discontinued on 15 November 2002 and will expire on 15 November 2005. This product was not included in this review.

² Product 15694 was discontinued on 31 December 2002 and will expire on 31 December 2005. This product was not included in this review.

³ Product 15863 was discontinued on 30 April 2002 and will expire on 31 December 2005. This product was not included in this review.

Appendix VI Canadian labelling requirements for domestic end-use products with respect to human health

NOTE: The information in this appendix summarizes required label statements for domestic class products containing warfarin, brodifacoum, bromadiolone, chlorophacinone, or diphacinone or its sodium salt resulting from this re-evaluation. This appendix does not identify all label requirements for individual end-use products such as first aid statements, disposal statements, precautionary statements, and supplementary personal protective equipment (PPE) that may be required. Additional information on labels for currently registered products should not be removed unless it contradicts information in this appendix.

To protect handlers, and to protect children, pets and livestock from accidental ingestion, all warfarin, brodifacoum, bromadiolone, chlorophacinone, and diphacinone and its sodium salt domestic end-use product labels must be modified to include the following statements:

- In the PRECAUTIONS section of the secondary panel of the label,

“KEEP OUT OF REACH OF CHILDREN, PETS AND LIVESTOCK. May be harmful or fatal if swallowed or absorbed through the skin. Rubber gloves must be worn when handling this product. Avoid contact with eyes, skin or clothing. Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Wash skin thoroughly with soap and water after handling. Wash contaminated clothing, separately from other laundry, with soap and hot water before reuse. KEEP AWAY FROM FEED AND FOODSTUFFS.”
- In the USE LIMITATIONS section of the secondary panel of the label,

“Bait **MUST** either be placed in tamper-resistant bait stations or in locations not accessible to children, pets or livestock. **DO NOT** place bait in areas where there is a possibility of contaminating food or surfaces that come in direct contact with food.”
- In the TOXICOLOGICAL INFORMATION section, **the intravenous route of administration of the Vitamin K₁ antidote must be removed from the label.**
- In the FIRST AID section of the label,

“For all cases of human ingestion, immediately notify a physician or poison control centre.”

“If pet or livestock poisoning suspected, immediately contact a veterinarian.”

- In the STORAGE section of the label,

“Store in a cool, dry place away from other chemicals and food or feed. Store product not in use, in original container, in a secure location inaccessible to children and non-target animals.”
- In the DISPOSAL section of the label,

“Any person who retrieves carcasses or unused bait following application of this product must wear rubber gloves.”

Appendix VII Canadian labelling requirements for commercial end-use products with respect to human health

NOTE: The information in this appendix summarizes required label statements for commercial class products containing warfarin, brodifacoum, bromadiolone, chlorophacinone, or diphacinone or its sodium salt resulting from this re-evaluation. This appendix does not identify all label requirements for individual end-use products such as first aid statements, disposal statements, precautionary statements, and supplementary personal protective equipment (PPE) that may be required. Additional information on labels for currently registered products should not be removed unless it contradicts information in this appendix.

In order to ensure that commercial end-use products are used by certified applicators only, the labels must be modified to include the following statement:

- On the principal panel of the label,

“Only to be used by individuals holding an appropriate pesticide applicator certificate or license recognized by the provincial/territorial pesticide regulatory agency where the application occurs.”

To protect handlers, and to protect children, pets, and livestock from accidental ingestion, all warfarin, brodifacoum, bromadiolone, chlorophacinone, and diphacinone and its sodium salt commercial end-use product labels must be modified to include the following statements:

- In the PRECAUTIONS section of the label,

“KEEP OUT OF REACH OF CHILDREN, PETS AND LIVESTOCK. May be harmful or fatal if swallowed or absorbed through the skin. Chemical resistant gloves must be worn when handling this product. Avoid contact with eyes, skin or clothing. Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Wash skin thoroughly with soap and water after handling. Wash contaminated clothing, separately from other laundry, with soap and hot water before reuse. KEEP AWAY FROM FEED AND FOODSTUFFS.”
- In the USE LIMITATIONS section of the label,

“Bait **MUST** either be placed in tamper-resistant bait stations or in locations not accessible to children, pets or livestock. **DO NOT** place bait in areas where there is a possibility of contaminating food or surfaces that come in direct contact with food.

To ensure safe use of this product, tamper-resistant bait stations must have the following characteristics:

- * constructed of high-strength material (e.g., metal or injection moulded plastic) and resistant to destruction by children and non-target animals;
- * entrance designed so that children and non-target animals cannot reach the bait;
- * internal structure that prevents bait from being shaken loose;
- * access panel which fastens securely and locks (e.g., metal screw or padlock);
- * capable of being securely fastened to a surface (e.g., nailed down); and
- * clearly labelled: "WARNING POISON".

- In the TOXICOLOGICAL INFORMATION section, **the intravenous route of administration of the Vitamin K₁ antidote must be removed from the label.**

- In the FIRST AID section of the label,

“For all cases of human ingestion, immediately notify a physician or poison control centre.”

“If pet or livestock poisoning suspected, immediately contact a veterinarian.”

- In the STORAGE section of the label,

“Store in a cool, dry place away from other chemicals and food or feed. Store product not in use, in original container, in a secure location inaccessible to children and non-target animals.”

- In the DISPOSAL section of the label,

“Any person who retrieves carcasses or unused bait following application of this product must wear chemical resistant gloves.”

- In the DIRECTIONS FOR USE section,

“Users should remove clothing immediately if pesticide gets inside. Then wash skin thoroughly and put on clean clothing.”

All commercial end-use products that are registered for use in indoor commercial establishments must include the following statement:

- On the product label in the DIRECTIONS FOR USE section,

“Do not use in edible product areas of food or feed processing plants, restaurants or other areas where food or feed is commercially prepared or processed. Do not contaminate food/feed or food/feed handling equipment or place near or inside ventilation duct openings.”

For commercial end-use products that are dust or powder concentrate formulations that must be diluted prior to use, the following statement is required:

- In the DIRECTIONS FOR USE section,

“All handlers must wear long-sleeved shirt and long pants, shoes plus socks, and chemical resistant gloves. Wear a NIOSH approved dust/mist filtering respirator and protective eyewear while pouring and mixing the concentrate with bait.”

For commercial end-use products that require loading of pellets or bait into mechanical ground equipment or loading/applying with handpushed or hand-held equipment, the following statement is required:

- In the DIRECTIONS FOR USE section,

“All handlers must wear long-sleeved shirt and long pants, shoes plus socks, and chemical resistant gloves. In addition, persons loading pellets or bait into mechanical ground equipment, or persons loading/applying with handpushed or hand-held equipment, must wear a NIOSH approved dust/mist filtering respirator and protective eyewear.”

For all other commercial pellet and bait formulations not already contained in place packs, the following statement is required on all commercial end-use products:

- In the DIRECTIONS FOR USE section,

“All handlers must wear long-sleeved shirt and long pants, shoes plus socks, and chemical resistant gloves when handling this product.”

The following statement is required on labels of warfarin concentrates used to prepare dry baits:

“Exposure to warfarin during pregnancy should be avoided. Warfarin may cause harm to the fetus, including possible birth defects.”